

**EXHIBIT 54**  
**[FILED UNDER SEAL]**

HIGHLY CONFIDENTIAL - SUBJECT TO PROTECTIVE ORDER

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
SHERMAN DIVISION**

The State of Texas, et. al.,  
Plaintiffs,

vs.

Google LLC,  
Defendant.

Case No: 4:20-cv-00957  
Sean D. Jordan

**EXPERT REPORT OF MICHAEL R. BAYE**  
**August 6, 2024**

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**SUBJECT TO PROTECTIVE ORDER**

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**I. QUALIFICATIONS**

1) I am the Bert Elwert Professor of Business Economics and Public Policy at the Indiana University Kelley School of Business. I am also an Academic Affiliate at NERA Economic Consulting. I received my B.S. in Economics from Texas A&M University in 1980 and my Ph.D. in Economics from Purdue University in 1983. I have also held tenured positions on the faculties of Texas A&M University and The Pennsylvania State University and have served as a visiting professor at the University of Oxford, the University of Cambridge, and a number of other universities. I received a Fulbright Research Scholar Award to conduct research on spatial pricing at Erasmus University in The Netherlands.

2) My academic research focuses on microeconomics and industrial organization, which is the study of how buyers and sellers interact in the marketplace to determine market clearing prices, and how a variety of business strategies and government regulations impact market prices, firm profits and the welfare of consumers. My research includes work on antitrust, monopolies and oligopolies, advertising, two-sided markets, brand and location advantages, price competition, auctions and competitive bidding, price dispersion, and non-price competition. I have published many articles in the leading academic journals in economics and marketing and have written and edited a number of books. I am the co-author of *Managerial Economics and Business Strategy*, now in its tenth edition with McGraw-Hill. It is the leading managerial textbook in the world and has been translated into a variety of foreign languages, including Russian, Chinese, Spanish, Korean, Portuguese, Albanian, Indonesian, and Macedonian. I am also the co-author of *Money, Banking and Financial Markets: An Economic Approach*, published by Houghton Mifflin.

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3) I have also edited or co-edited a variety of journals in economics, marketing, and public policy. I currently serve as a co-editor of the *Journal of Economics and Management Strategy*.

4) During 2007 and 2008, I served as the Director of the Bureau of Economics at the U.S. Federal Trade Commission (FTC)—the most senior position held by an economist at the FTC. In this capacity, I directed a staff that included approximately 70 Ph.D. economists and advised the Commission on microeconomic issues related to its antitrust, consumer protection, and public policy missions. In addition to my extensive economic experience while at the FTC, I have provided expert economic testimony on economic matters before U.S. courts and foreign tribunals on behalf of the U.S. Department of Justice (DOJ), the Canadian Competition Bureau, and private parties.

5) I served on the Academic Research Council of the U.S. Consumer Financial Protection Bureau (CFPB) during 2019-2021, and as its Chairman from October 2019 through September 2020. In this capacity I advised the CFPB about its strategic research planning process and research agenda, including views on the research that the Bureau should conduct relating to consumer financial products or services, consumer behavior, cost-benefit analysis, and other topics to enable the agency to further its statutory purposes and objectives. I also provided the Office of Research with technical advice and feedback on research methodologies, data collection strategies and methods of analysis, including methodologies for quantifying the costs and benefits of regulatory actions related to consumer protection.

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6) My publications and prior testimony are listed on my curriculum vitae, which is appended to this report as Appendix I.<sup>1</sup>

## II. ASSIGNMENT

7) The State of Texas and a consortium of other states and commonwealths (collectively, “Plaintiffs” or “Plaintiff States”) allege that Google monopolized multiple digital advertising technology (“ad tech”) markets and engaged in a series of anticompetitive conduct and deceptive trade practices in violation of the Sherman Act, as well as the antitrust laws and deceptive trade practice laws of the Plaintiff States.

8) I have been asked by counsel for Google to evaluate Plaintiffs’ claims that Google has engaged in anticompetitive conduct in its provision of ad tech services from the perspective of an economist. To undertake this assignment, I consider: (a) the relevant market or markets in which Google’s ad tech competes; (b) the extent to which Google possesses and exercises monopoly power in the relevant market(s); (c) the effect(s) of the challenged conduct on competition in the relevant markets; and (d) the economic consequences of certain structural and behavioral remedies that Plaintiffs’ experts propose. In connection with this assignment, I also have been asked to evaluate the economic soundness and reliability of certain conclusions offered by Plaintiffs’ experts, as expressed in their expert reports.

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<sup>1</sup> NERA is compensated at a rate of \$1,350 per hour for time I spend on this matter. This was my standard rate at the time of engagement. Professional fees charged by NERA for staff working under my supervision range from \$225 per hour to \$590 per hour. These fees are not contingent upon the outcome of this matter.

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**III. INFORMATION RELIED UPON**

9) The economic conclusions described in my report are based on my training, experience, and expertise as an academic and professional economist, my review and analysis of testimony, documents, and data produced in the course of this litigation, relevant academic literature, and review and analyses of data by staff working under my supervision. I also rely on my own research and analysis. A list of documents, data, and other information I have relied upon in reaching my conclusions is included as Appendix II.

10) These opinions are based on my review and analysis of information made available to me to date and are expressed from the perspective of an economist addressing questions of antitrust economics. Although I do not expect to change my methodology or general approach in this matter, I respectfully reserve the right to update my analyses or alter my opinions should data, documents, analyses, or inadvertent errors be brought to my attention.

**IV. SUMMARY OF OPINIONS**

11) Plaintiffs (and their experts) depict an ad tech industry in which innovation has been stifled, rivals have been foreclosed, and advertisers and publishers have been harmed, all as a result of Google's alleged anticompetitive conduct. After carefully reviewing the data and documents in the case, I find the reality to be far different. In my opinion, the ad tech industry has been competitive and dynamic during the period in which Plaintiffs allege that Google has acted anticompetitively and that advertisers, publishers, and users (i.e., internet users or content viewers) have each benefited from this competition. Google's continual innovations have resulted in advertisers being able to reach larger audiences, publishers being able to better monetize their ad inventory, and users seeing more relevant ads. At the



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same time, the quality-adjusted price of using Google's ad tech platform has declined. These trends are inconsistent with Google monopolizing the ad tech industry and harming competition.

12) The fundamental error that Plaintiffs (and their experts) make in evaluating Google's conduct is mistaking competition on the merits for anticompetitive conduct. While anticompetitive conduct forecloses rivals, harms competition, and thereby increases prices (or reduces quality), competition on the merits benefits customers with lower prices and/or better quality, even if rivals lose customers who switch to the more attractive offering. That is to say, competition on the merits can naturally lead to some businesses failing, but it can also drive innovation and benefit customers. This is distinct from anticompetitive conduct that stifles competition and ultimately harms customers.

13) The outcomes I observe in the ad tech industry are inconsistent with anticompetitive foreclosure and are consistent with competition on the merits. Google attracting customers away from rivals by offering lower prices or better quality is a clear case of competition on the merits. If Google had monopolized ad tech and foreclosed competitors, one would expect to see higher prices (or lower quality) and lower industry output as a result. This is not the case. Instead, data indicate that Google competes by investing in quality-enhancing features to grow the pie for publishers, advertisers, and users. Indeed, during the period Plaintiffs allege Google has monopolized ad tech, Google has faced increasing competition from large tech companies such as Meta, Amazon, TikTok, and Microsoft, as well as ad tech firms such as Criteo, The Trade Desk, Index Exchange, and Kevel, while new technologies that facilitate the buying and selling of digital ads, such as header bidding, have also emerged.

14) Against this backdrop, Plaintiffs (and their experts) nevertheless claim that (i) certain components of Google's ad tech platform possess monopoly power in artificially narrow markets and

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(ii) Google has engaged in anticompetitive conduct that harms competition in those candidate markets. I have been asked to evaluate these claims and assess their validity. As I explain in detail below, I find that Plaintiffs' experts misapply economic theory, fail to conduct rigorous economic analysis, and reach conclusions that are at odds with the data and documents that do not reflect the commercial realities of how competition has evolved in the ad tech industry.

15) I show that Plaintiffs' primary economic expert, Professor Joshua Gans, ignores fundamental features of the ad tech industry and employs a faulty economic analysis. In particular:

- While Professor Gans acknowledges that it is "reasonable to consider ad tech tools as bringing the two sides of the market together," he inexplicably fails to reflect this industry feature in his analysis. Publishers benefit from more advertisers using ad tech tools to purchase ad inventory and advertisers benefit from more publishers offering their ad inventory for sale through ad tech tools. And both customer groups benefit when internet users have safe and enjoyable experiences viewing content. Google operates an integrated ad tech platform that serves both advertisers and publisher customers, and it must also consider the impact of its business decisions on internet users. Google benefits when all three groups benefit. Any conduct that harms publishers and reduces publishers' incentives to use ad tech in turn reduces the value of ad tech to advertisers. Similarly, any conduct that harms advertisers and reduces advertisers' incentive to use ad tech in turn reduces the value of that ad tech to publishers. Conduct that harms internet users ultimately harms publishers and advertisers, and this also reduces the value of Google's ad tech. Professor Gans does not account for these competitive realities, leading

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him to draw flawed conclusions with respect to market definition, monopoly power, and the competitive effects of Google's conduct.

- Professor Gans employs an incorrect test to arrive at his artificially narrow market definitions. Instead of considering whether a hypothetical monopolist in his candidate markets could profitably impose a small but significant, non-transitory increase in price (the "Hypothetical Monopolist Test"), Professor Gans asks whether a hypothetical monopolist could impose such a price increase without losing *all* customers in his candidate market. This question which is not economically relevant, causes Professor Gans to ignore meaningful competitive constraints such as social media and video advertising, and results in artificially narrow candidate markets. This also inflates the market shares Professor Gans reports and is one reason (of many) he draws the wrong conclusions about whether Google has monopoly power in his candidate markets.
- Professor Gans routinely conflates harm to competitors with harm to competition and mistakes competition on the merits for anticompetitive harm. I show that each of Google's business practices that Professor Gans claims is anticompetitive had in fact a legitimate business rationale and did not harm competition. Many of the practices facilitated better matches between publishers and advertisers, resulting overall in a higher return on investment for advertisers, or higher revenue for publishers, or both. Nowhere in his report does Professor Gans show that Google's conduct caused prices to go up or quality to go down for publisher or advertiser customers because ad tech rivals had been excluded and customers had no other alternatives. As a result of these errors and omissions, Professor Gans wrongly condemns Google's innovations that benefitted publishers, advertisers, and internet users.

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16) In this report, I correct the errors made by Professor Gans and other of Plaintiffs' experts. My analysis shows that, consistent with observed industry outcomes, Google faces substantial competition both from within and outside of Professor Gans' overly narrow candidate markets and has operated its ad tech stack in line with its incentive as a multi-sided platform to balance the interests of publishers, advertisers, and internet users.

**A. Ad Tech is a Dynamic and Growing Industry Marked by Vigorous Competition (Section V)**

17) Publishers of digital content (e.g., a website or an app) can choose to sell advertising space ("inventory") alongside that content. If they do, each person who navigates to the content (a "user") provides an opportunity for a digital advertisement to be shown (an "impression"). Advertisers can choose to purchase these impressions to reach users. "Ad tech" is technology that facilitates these purchases by matching publishers whose content has attracted users with advertisers hoping to reach those users. Some ad tech tools are publisher-facing (such as ad servers, which help publishers manage ad inventory and serve ads), and others are advertiser-facing (such as buying tools designed to help advertisers purchase ad inventory). In all cases, ad tech works to facilitate a "match" between a publisher and an advertiser.

18) Google competes with a host of providers of ad tech tools, and the number of firms participating in the ad tech industry has increased over the years. Google's buying tools include Google Ads and DV360. There are numerous firms that offer competing buying tools, including Meta, Amazon, TikTok, The Trade Desk, Criteo, Microsoft's Xandr, and many more. Google's publisher-facing tool in this case is Google Ad Manager ("GAM"). GAM integrates functionality that used to be part of a separate publisher ad server (DoubleClick for Publishers ("DFP")) and functionality that used to be part of a

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separate ad exchange (“AdX”). Ad exchanges are tools that use auctions to match publishers and advertisers and facilitate sales of impressions. There are many other firms that offer competing ad exchanges, including Magnite, Microsoft’s Xandr, PubMatic, and Index Exchange. In addition, rival firms have developed new technologies such as header bidding to match advertisers and publishers. There are many header bidding solutions from which customers can choose, including popular offerings from Amazon and others. There are also numerous firms that provide competing publisher ad servers, including Microsoft’s Xandr, Kevel, Equativ, and others. Further, various publishers have developed their own technologies for serving ads in-house, such as Disney+ and Hulu.

19) Within this competitive landscape, Google’s business model critically depends on internet users being able to view valuable publisher content. The value of Google’s keystone product (Google Search) as well as its ad tech products derive from the existence of valuable internet content for users to consume. Google therefore has an enhanced incentive to continuously improve the quality of its ad tech to (a) protect internet users from annoying or irrelevant ads, (b) provide tools that publishers can use to monetize content, and (c) ensure that the returns on ad spend that advertisers earn on the web are competitive with what they can achieve by reaching users on social media, apps, and other media.

20) Professor Gans portrays Google as a monopolist whose conduct has foreclosed competitors, lessened competition, and ultimately harmed advertisers and publishers. The economic evidence tells a far different story. Economists generally consider industry output, price, and quality to be key indicators of whether an industry is competitive and customers have been made better off as a result. As I explain in my report, during the period in which Plaintiffs claim Google has monopolized the ad tech industry, output and quality have increased, while prices have fallen. Such conditions are exactly what one would

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expect in a competitive environment and exactly the opposite of what one would expect to observe in an industry hampered by anticompetitive conduct.

21) ***Output of display ads has expanded exponentially.*** The significant expansion in output of display ads is inconsistent with Google's conduct causing harm to competition. Total spending on display ads grew exponentially from under [REDACTED] in 2008 to over [REDACTED] in 2023. The volume of display ad impressions on DFP sourced from Google Ads, DV360, AdSense, header bidding, Open Bidding, direct deals, and other demand sources has increased from approximately [REDACTED] in June 2013 to over [REDACTED] in March 2023. The volume of ad impressions transacted via header bidding—a competing ad tech intermediation tool that Professor Gans claims was harmed by Google's conduct—has increased from fewer than [REDACTED] in 2018 to more than [REDACTED] in 2023.

22) ***Quality of matched impressions facilitated by Google's ad tech has increased significantly.*** The click-through rate is an important metric for assessing the quality of an ad impression match because it measures how frequently users demonstrate through one type of action (clicking on an ad) that they are being shown relevant ads. Click-through rates were declining (i.e., ads were becoming less relevant) before Google acquired DoubleClick in 2008, and they increased thereafter, reflecting better matching of advertisers with users viewing publisher content. In 2009, the click-through rate on Google Ads was about 0.14 percent. This means that, on average, a user had to view about 750 ads before observing one relevant enough to click. By 2022, the click-through rate had increased to about 1 percent; this improvement in matching meant that users now only had to view around 101 ads before observing a click-worthy ad. These significant quality improvements are inconsistent with reduced competition in the ad tech industry and harm to users as a result of Google's business practices.

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23) ***Prices paid by advertisers have declined.*** If Google were a monopolist that was acting anticompetitively, one would expect to see rising prices. But Google's advertiser customers are paying lower prices over time. The cost per click for advertisers using Google Ads declined from about [REDACTED] just after the DoubleClick acquisition to about [REDACTED] in 2022. The cost per click for advertisers using DV360 also has declined from [REDACTED] in August 2016 to [REDACTED] in 2022. The platform fees that DV360 charges to advertisers who buy impressions through its buying tool likewise have been declining over time and were at [REDACTED], measured relative to the value of the ad impressions purchased, in 2023.

24) ***Prices charged to publishers have declined.*** If Plaintiffs' (and their experts') conclusions about Google allegedly monopolizing the ad tech industry were true, one would also expect that publishers would be paying higher prices for using ad tech in the form of higher revenue shares and serving fees. But that is not the case. Google's ad serving fees have decreased by roughly one third from around [REDACTED] per thousand impressions in 2014 to [REDACTED] per thousand impressions in 2022. In fact, [REDACTED] of Google's ad serving customers paid no fees at all from 2020 to 2023. While the average revenue share on Google's ad exchange (AdX) has not declined as much in nominal terms, Google's quality improvements have translated into lower quality-adjusted prices for publishers over time. Moreover, over the last 15 years, Google's average revenue share for its ad exchange has been lower than several competitors.

25) ***Ad Tech Customers Have Many Options.*** The positive industry trends I summarize above and describe in my report are consistent with data indicating that Google's customers have numerous options. Put another way, there is no shortage of competitors to whom advertisers and publishers can

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turn to help them buy and sell display ads if they were dissatisfied with the quality or price of Google's tools.

26) ***Advertisers Have Alternatives to Google's Buying Tools.*** Google data alone indicate that advertisers can purchase display ads using over 600 avenues, including various demand-side platforms, direct deals, ad networks, and agency trading desks. Google data alone indicate that, between June 2013 and March 2023, advertisers purchased over 5 billion impressions from each of 40 different avenues for buying display ads. Advertisers thus have many alternatives to Google's ad buying tools, and they are already using multiple tools. Such "multi-homing" indicates low switching costs, allowing advertisers to easily shift their ad spending to non-Google ad buying tools if the price of Google's ad buying tools increased or the quality of Google's ad buying tools declined. The presence of numerous alternatives and multi-homing is inconsistent with Plaintiffs' (and their experts') claims that Google has stifled competition in ad tech.

27) ***Advertisers and Publishers Have Alternatives to Google's AdX Ad Exchange.*** Publishers and advertisers have a variety of ways to connect to buy and sell digital ads, including ad exchanges, ad networks, and direct deals. Google data alone indicate that publishers have used more than 65 ad exchanges to compete with AdX through header bidding or Open Bidding since 2018. Google data alone indicate that advertisers in the U.S. used more than 40 different ad exchanges in 2016, growing to at least 45 by 2020. The median U.S. advertiser on DV360 has bid on 10 or more ad exchanges for transactions each month since January 2016, and that number has grown to almost 20 since early 2021. Ad exchanges also are connecting to and transacting with a growing number of U.S. advertisers on DV360. Of the top 20 ad exchanges transacting with buyers using DV360, most connected to about



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4,600 advertisers per month in early 2016, with the number of connections growing to approximately to 19,000 advertisers per month by early 2023. The presence of numerous alternative ad exchanges is inconsistent with Plaintiffs' (and their experts') claims that Google has foreclosed rivals and stifled competition.

28) ***Publishers Have Alternatives to Google's Ad Server.*** Customers have alternatives publisher ad servers to which they can turn if they are dissatisfied with Google's services—including Microsoft's Xandr. The limited data available in the record from four third-party publisher ad servers, from January 2013 to July 2023, show increases in the number of publishers these ad servers have supported over time. Publishers can also utilize free, open-source ad serving tools, and several large publishers have developed ad serving tools for use with their own web and mobile properties rather than rely on third parties for ad serving tools. These factors plus declining ad server fees—and the fact that [REDACTED] of Google's publishers do not pay any fees to use its ad server—are inconsistent with Plaintiffs' (and their experts claims) that Google has foreclosed rivals and stifled competition.

29) These types of direct evidence are the key indicators for assessing whether an industry is competitive and customer welfare has improved. The evidence clearly demonstrates that, during the period that Google has allegedly monopolized the ad tech industry, spending on display ads has grown significantly, the quality of Google's products has increased, the prices Google charges have declined, and the number of alternative competitors that advertisers and publishers can use to buy and sell display ads has increased. These industry patterns are consistent with vigorous competition—and they are the exact opposite of what one would expect had Google foreclosed competition and harmed customers as Plaintiffs assert in their Complaint and their experts purport to find in their reports.

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**B. Professor Gans Defines Artificially Narrow Relevant Markets (Section VI)**

30) Before turning to Google's allegedly anticompetitive conduct, Professor Gans defines four candidate antitrust markets in which to evaluate the effects of that conduct: (1) buying tools for small advertisers, (2) buying tools for large advertisers, (3) ad exchanges, and (4) publisher ad servers. Rather than including in each of those alleged markets all transactions facilitated by those tools, Professor Gans excludes transactions covered by direct deals—i.e., those negotiated directly between a publisher and advertiser and then transacted through a publisher ad server—as well as transactions for video ads, mobile in-app ads, social media ads, and more. Professor Gans' conclusions about market definition are flawed and unreliable because (among other reasons) they artificially exclude Amazon, Meta, Microsoft, TikTok, and many other ad tech firms that obviously compete with Google. The most appropriate framework for analyzing the antitrust claims in this case—one that recognizes the full range of competitive pressures facing Google—is as multi-sided transaction platform for matched display advertising transactions that is plausibly at least as large as all display ads as defined by eMarketer and other industry participants (e.g., including video ads, mobile in-app ads, social media ads, and direct deals).

31) Professor Gans' conclusions about the appropriate relevant markets to use in this case are purportedly based on two methodologies: (1) a qualitative assessment of *Brown Shoe* factors and (2) an application of the Hypothetical Monopolist Test. Mistakes in the application of both methodologies lead him to reach erroneous conclusions about market definition. Professor Gans' *Brown Shoe* analysis is flawed because he cherry picks which factors to analyze and which to ignore. For the factors he does analyze, his analysis suffers from several flaws and therefore his conclusions are unreliable. Professor Gans also fundamentally misapplies the Hypothetical Monopolist Test, leading him to draw incorrect

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conclusions about the contours of his candidate relevant markets. These errors have the effect of artificially excluding key rivals that compete against (and constrain) Google, and candidate markets that are too narrow.

32) ***Brown Shoe Factors Do Not Support Professor Gans' Candidate Markets.*** Professor Gans uses so-called “*Brown Shoe*” factors to attempt to identify relevant markets in this case. *Brown Shoe* factors assess qualitative information (e.g., about product uses and pricing) to determine whether products are sufficiently similar to be included in the same relevant market. Professor Gans claims that his *Brown Shoe* analysis supports his candidate markets, but that is not the case. In fact, Professor Gans cherry picks only three of the seven *Brown Shoe* factors to support his candidate markets. Not only do the factors that Professor Gans ignores undercut his candidate market definitions, but he also reaches the wrong conclusions on each of the three factors that he considers.

33) The first *Brown Shoe* factor that Professor Gans discusses is “industry or public recognition of the market.” Professor Gans asserts without basis that each of his candidate relevant markets are supported by “industry or public recognition of the market.” However, virtually all industry sources reject Professor Gans’ narrow definition of display ads. Industry sources, as well as Google’s internal documents, routinely include video ads, social media ads, and mobile in-app ads—regardless of whether transacted directly or indirectly—within “display ads.” These sources do not recognize a market for “open web display” ad tech tools specifically for Professor Gans’ narrow definition of display ads.

34) The second *Brown Shoe* factor that Professor Gans discusses is “peculiar uses and characteristics.” Though Professor Gans asserts that his candidate markets are defined by “peculiar uses and characteristics,” the same ad tech tools used to transact his narrow definition of “open web display”

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ads are also used to transact other types of display ads. Further, by focusing on similarities in an arbitrary set of product characteristics, rather than on what customers view as substitute products, Professor Gans fails to consider that product differentiation can itself be a form of competition.

35) The third *Brown Shoe* factor that Professor Gans discusses is whether his candidate markets have “distinct and independent price structures.” Professor Gans asserts that the ad tech tools used for “open web display” transactions in his candidate markets have “distinct and independent price structures,” but he never compares those tools to ad tech tools excluded from his candidate markets. As a result, he has no basis to conclude that there are distinct pricing structures for the products within the candidate markets he has put forward. My assessment demonstrates that Professor Gans has excluded tools from his candidate markets that share the price structures of the tools he has included. For example, Professor Gans indicates that “small advertiser buying tools” sell ads on a cost per click (“CPC”) basis, but he excludes from his “small advertiser buying tool” candidate market other buying tools that also sell ads on a CPC basis, such as Google’s DV360.

36) Professor Gans provides no explanation for why he ignores the remaining four *Brown Shoe* factors. Had he considered the remaining factors, it would have been evident that they do not support his narrow market definitions. First, with respect to the *Brown Shoe* factor of “unique production facilities,” publisher ad servers, ad exchanges, and ad buying tools for his “open web display ads” appear to be “produced” with the same technology (i.e., software) as the tools used for direct deals and other ad formats. Hence, the absence of “unique production facilities” is an indicator that Professor Gans’ candidate markets are overly narrow.

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37) Second, Professor Gans' candidate markets do not comprise a set of "distinct customers" that distinguish his narrow market from a market including other display ads. Ad-buying tools for Professor Gans' narrow "open web display ads" share customers with tools he excludes from his candidate markets. Likewise, many customers inside Professor Gans' narrow candidate markets for ad exchanges and publisher ad servers also use ad tech to transact and serve video ads, mobile in-app ads, and other display ads that Professor Gans excludes from his candidate markets. Moreover, a substantial amount of ad spend comes from advertisers using both the ad buying tools in Professor Gans' candidate market for buying tools for "small advertisers" and ad buying tools for "large advertisers."

38) Third, with respect to the *Brown Shoe* factor of "specialized vendors," vendors who offer ad servers, ad exchanges, and ad-buying tools for "open web display" ads often offer these same ad tools for other digital ad types. Publishers and advertisers often use these tools to optimize inventory management and ad spending, respectively, across these digital ad types. Professor Gans' conclusion that there exist antitrust markets of ad tools specifically for "open web display" is also inconsistent with this *Brown Shoe* factor.

39) Fourth, with respect to the *Brown Shoe* factor of "sensitivity to price changes," Professor Gans does not analyze any actual evidence of user switching patterns, nor does he calculate the cross-price elasticity of demand across potential substitute products.

40) ***Professor Gans Misapplies the Hypothetical Monopolist Test.*** Professor Gans purports to employ the Hypothetical Monopolist Test to support his conclusions about the relevant antitrust markets that should be used to analyze this case. The Hypothetical Monopolist Test is supposed to ask whether a hypothetical monopolist of a candidate market likely would find it profitable to impose a small *but*

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*significant and non-transitory increase in price* (“SSNIP”), or whether such a price increase would cause the hypothetical monopolist to lose so many sales that it would be unprofitable to impose one. If a SSNIP likely would be unprofitable, then the candidate market would be too narrow to be a relevant market for antitrust purposes.

41) Professor Gans never actually conducts a hypothetical monopolist test: he never defines a SSNIP, he never identifies the competitive baseline price from which a SSNIP should be calculated, he never provides any measures of diversion among products in response to a SSNIP, and he never analyzes whether any diversions (which he never measures) would render a SSNIP unprofitable.

42) The test that Professor Gans applies bears no resemblance to an actual Hypothetical Monopolist Test and appears to be nothing more than his subjective opinions about substitutability. In particular, Professor Gans’ test incorrectly ignores the basic economic principle that substitution occurs at the margin, leading him to define erroneously narrow product markets. Rather than examining whether *enough* customers would reduce product *usage* to prevent a hypothetical monopolist from imposing a profitable SSNIP, Professor Gans’ analysis asserts that a SSNIP is unprofitable only if *all* customers in a candidate product market would decide to *stop using* the product. Professor Gans summarily concludes that not all customers would substitute away from his candidate markets in the event of a SSNIP, and therefore that a hypothetical monopolist could profitably impose a SSNIP. That is not the correct test, and it leads to flawed conclusions.

43) In industries involving two-sided transactions platforms (like the ad tech industry), the Hypothetical Monopolist Test should take account of all indirect network effects, but Professor Gans’ one-sided approach to defining component-specific candidate markets fails to do so. Ad tech exhibits

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“indirect network effects” because the value to advertisers increases the more publishers use ad tech and vice versa. Indirect network effects are important in this case because the alleged conduct centers on Google’s role as a multi-sided platform that matches advertisers with publisher impressions displayed to internet users. Yet Professor Gans does not consider how an increase in prices paid by advertisers for a particular ad tech tool would decrease not only advertiser demand for that tool, but also publisher demand for ad tech more broadly (because lower advertiser demand, in turn, leads to lower publisher demand). By ignoring these indirect network effects, Professor Gans’ one-sided approach systematically ignores the impact of customers on one side substituting away from a candidate market in response to a SSNIP on the other side. He also ignores indirect network effects and substitution by users: they are likely to respond to the reductions in open web publisher content he predicts by spending more time on mobile apps, social media and other ad formats and devices he excludes. Because matched impressions require users in addition to advertisers and publishers—and substitution by any one of these groups reduces the profitability of a SSNIP—his one-sided framework results in candidate markets that are too narrow.

44) ***Professor Gans’ Market Definition is Flawed Because He Ignores Google’s Vertical Integration.*** Professor Gans also fails to consider Google’s integration of ad tech components (i.e., Google’s vertical integration), leading him to an incorrect market definition. By not accounting for vertical integration, Professor Gans incorrectly assesses the pricing incentives of the hypothetical monopolist. Even under Professor Gans’ erroneous approach of defining distinct “tools” markets, vertical integration is relevant because a price increase of one component would also lower demand and revenues for other components across the ad tech stack. For example, in evaluating the overall profitability of raising the price of ad servers, a hypothetical integrated monopolist over ad servers would account for lost sales in both the server and ad exchange lines of business. The latter (i.e., lost sales in

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the ad exchange market) would be ignored by a hypothetical non-integrated monopolist of publisher ad servers. Importantly, this effect is in addition to incentive effects stemming from indirect network effects that arise even in the absence of integration. Professor Gans fails to consider that the cost to a vertically integrated hypothetical monopolist of not attracting the next customer, or driving away even one existing customer, is high because it might lose potential sales related to the publisher ad server, ad exchange, and ad buying tool. The Hypothetical Monopolist Test applied to an integrated versus non-integrated set of firms therefore will arrive at different results because the opportunity cost of lost sales from a SSNIP is larger for an integrated than a non-integrated firm. For any SSNIP, the hypothetical integrated monopolist loses more than a non-integrated monopolist, meaning that the product market will be drawn too narrowly if one does not account for vertical integration.

45) ***Professor Gans Ignores Meaningful Competitive Constraints to Define Artificially Narrow Markets.*** Professor Gans' market definition opinions center on a narrow subset of display ads. Professor Gans' definition of "display ads" excludes ads sold through direct deals, video ads, and ads shown on "walled gardens," mobile apps, social media sites, smart TVs, game consoles, and set top boxes. In contrast, various industry participants define display ads as visual ads that contain video, image, or text elements to market products or services to capture the attention of users or encouraging them to take action. They include formats such as banner ads, rich media ads, video ads, and interstitial ads. They also may be transacted directly or indirectly and appear across websites, social media, and in-apps using desktop and laptop computers as well as mobile phones, tablets, connected TVs or related devices.



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46) Data in the record show that advertisers purchase not only Professor Gans’ narrow definition of display ads, but a variety of display ads in other advertising channels and formats. While advertisers might face some small frictions in shifting their ad spend from one channel to another that they do not currently use—such as establishing a new contract, setting up an account, and learning a new system—when advertisers already allocate ad spend across multiple ad channels and formats (e.g., multi-home), the costs of shifting ad spend are likely de minimis. Out of approximately 2.1 million advertisers that used Google Ads between July 2015 and March 2023 to buy Professor Gans’ narrow definition of display ads, a small fraction (about 10 percent) transacts only “inside” Professor Gans’ narrow definition of display ads, while the vast majority allocate ad spend across both Professor Gans’ narrow definition of display ads and one or more “outside” options (such as video or in-app ads).

47) Similarly, publishers who use AdX to sell impressions routinely earn revenue from: (i) other types of properties (such as apps and CTV) and/or (ii) other ad formats (such as video and audio ads). More than 55 percent of AdX publishers sell both Professor Gans’ narrow definition of display ads and in-app ads, CTV ads, video ads, audio ads, and/or other formats and environments. Publishers can easily sell the same ad inventory “inside” or “outside” Professor Gans’ market (e.g., by allotting the same space next to its content to be a video ad rather than a static image, or by selling inventory via direct deals instead of programmatically). More broadly, publishers can shift focus for content creation to other types of properties (e.g., in app content or CTV rather than websites) if advertiser demand shifts to those channels. This evidence that both advertisers and publishers can and do transact ads across a variety of formats and channels, both directly and indirectly, shows the ease of substitution outside of Professor Gans’ narrow definition of display ads. Professor Gans’ candidate markets therefore do not reflect reality.

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48) Even limited to Professor Gans’ narrow definition of display ads, advertisers multi-home with ad tech tools “inside” and “outside” of his narrowly drawn candidate markets. For example, advertisers use both Google Ads (in Professor Gans’ “buying tools for small advertisers” candidate market) and DV360 (in Professor Gans’ “buying tools for large advertisers” market) to buy substantial volumes of ads. This multi-homing is inconsistent with distinct buying tool markets for “small” and “large” advertisers.

49) ***Google’s Ad Tech Products are Best Analyzed as a Multi-Sided Transaction Platform.*** To analyze the conduct at issue in this case, one must take into Google’s incentives as a multi-sided platform, accounting for indirect network effects. Although Professor Gans recognizes that indirect network effects exist, he defines one-sided candidate markets that assume them away. In my opinion, the presence of indirect network effects means that the appropriate framework for analyzing the antitrust claims in this case is a multi-sided transaction platform market for matched display ad impressions created when an advertiser is matched to a publisher and the advertiser’s ad is displayed to an internet user. An advertiser or publisher “pays” to use the tools offered by firms operating in Professor Gans’ candidate markets when matched impressions are served. As a result, advertisers are buying matches with publisher impressions, and publishers are buying matches with advertisers, and the relevant product is matched impressions. For the reasons discussed above, the relevant product market plausibly includes at least all display ad transactions, consistent with industry usage of the term, including all direct deals.

50) In sum, Professor Gans ignores Google’s role as a multi-sided transaction platform and, even assuming it is appropriate to define distinct “tools” markets (which it is not), the vertical integration of the components in its ad tech stack. Further, he fails to establish that his narrow definition of display

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ads (which excludes video, app, and social media ads, as well as ads negotiated through direct deals) comports with commercial realities and is appropriate for analyzing the antitrust claims in this matter.

**C. Google Does Not Have Monopoly Power (Section VII)**

51) Monopoly power is the ability to substantially increase prices above (or reduce quality below) competitive levels for a sustained period. Professor Gans concludes that Google has monopoly power in his candidate markets for publisher ad servers, ad exchanges, and ad buying tools for small advertisers. He does not claim that Google has monopoly power or market power in his candidate market for ad buying tools for large advertisers.

52) Professor Gans' opinions about monopoly power are tied to his flawed framework for defining relevant antitrust markets. Understanding why Google cannot plausibly have monopoly power is straightforward: it is because Google competes not only against large established ad tech firms such as Meta, Amazon, TikTok, and Microsoft, but also against numerous other competitors across the ad tech stack. The only way Professor Gans can conclude that Google has monopoly power is by constructing artificially narrow candidate markets that exclude key competitors and types of display ads that constrain Google. When examined with the proper relevant market framework—a multi-side transaction platform for matched display ad impressions—Google's share has declined from just over [REDACTED] in 2014 to about [REDACTED] in recent years.

53) Even accepting Professor Gans' claim that there should be separate product markets for publisher ad servers, ad exchanges, and buying tools for small advertisers, Google's shares are significantly lower than what Professor Gans reports when one accounts for the full range of display ads transacted through those tools. If one expands Professor Gans' narrow definition of display ads so that

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it is consistent with eMarketer's use of the term (e.g., to include video, social media, and mobile in-app ads as well as direct deals), Google's share of display ad spending via buying tools peaks at about [REDACTED] in 2016 and declined to about [REDACTED] in 2022. Likewise, based on eMarketer's definition of display ads, Google's ad exchange share has consistently been below [REDACTED] of U.S. ad spend and has been falling in recent years. While Professor Gans has not used relevant data to calculate Google's market share in his candidate ad server market, Google's pricing in a stand-alone ad-server market is inconsistent with Google having monopoly power in such a market. Google's ad server fees have declined, despite increases in impressions served. Furthermore, [REDACTED] of Google's ad server customers pay zero fees to serve ads (these are primarily small publishers). Many large publishers have the ability to use in-house solutions, and several companies have done so.

54) But even assuming Professor Gans has properly defined his candidate markets (which he has not), he does not demonstrate that Google has (or is likely to obtain) monopoly power in those markets. First, he does not analyze any direct evidence (i.e., evidence of output, quality, or price) that would support his conclusions about Google's monopoly power. When I examine the direct evidence, it clearly shows that Google does not have (and is unlikely to obtain) monopoly power.

55) Second, Professor Gans' analysis of the indirect evidence (e.g., market shares) is unreliable. Even accepting his framework, Professor Gans' calculations of market shares contain errors. When his errors are corrected, his methodology indicates that Google's shares are substantially smaller than he reports. Professor Gans also misinterprets his market share figures. He does not provide any explanation for why the shares demonstrate monopoly power, rather than Google attracting customers because it offers them superior tools at a favorable price that they prefer to use over those offered by Google's

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rivals. Professor Gans also ignores the prevalence of multi-homing by advertisers and publishers, and cross-visitation patterns of users. The implication of widespread multi-homing and cross visitation is that market shares overstate Google's competitive significance and understate the significance of Google's rivals. Put differently, data demonstrates that Google's advertiser and publisher customers can relatively easily divert a portion of their ad spend and inventory to competitors if Google were to raise its prices or reduce quality.

56) ***Professor Gans Provides No Direct Evidence of Monopoly Power.*** A fundamental omission in Professor Gans' analysis is that, despite defining monopoly power as "the ability to price a product above the competitive level, [or] reduce quality, service and/or innovation below the competitive level," he fails to provide any data on industry output, or Google's pricing or quality. Further, Professor Gans fails to define the competitive benchmark against which to measure Google's pricing or quality. Although such data available, Professor Gans instead relies only on purported structural characteristics of the ad tech industry, such as market shares, assertions that switching costs are high, data advantages, and entry and exit (i.e., indirect evidence of monopoly power). This myopic focus on structure, rather than the key metrics of competitiveness in an industry (i.e., price, output, and quality), renders his conclusions about monopoly power incomplete and unreliable.

57) ***The Direct Evidence Is Inconsistent with Google Having Monopoly Power.*** Unlike Professor Gans, I examine the direct evidence most relevant to assessing monopoly power. That evidence shows that, while both industry and Google's output have expanded, Google's prices charged to publishers and advertisers have remained steady or declined. At the same time, quality (as measured by match/conversion rates and internet user satisfaction with the online advertising ecosystem) has

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increased. Consistent with the competitive nature of this landscape, Google has invested extensively in ad tech advancements to bolster its competitive standing. If Google had monopoly power, I would expect the data to show declining output and higher prices as a result of Google being able to dictate terms to customers unconstrained by rivals. The industry trends I observe show the opposite and are inconsistent with Google having (or being likely to obtain) monopoly power.

58) ***Professor Gans' Analyses of Indirect Evidence Contain Errors and are Unreliable.*** Even assuming Professor Gans' candidate markets are correct, his assessment of market shares, switching costs, and entry barriers overstate Google's market power and understate the competitive significance of Google's rivals. First, his market share calculations contain errors and correcting those errors results in substantially lower shares. Second, even accepting his reported (but incorrect) shares, these shares do not demonstrate that Google enjoys monopoly power. Professor Gans fails to explain why the shares he purports to find are more likely to demonstrate monopoly power than Google offering customers higher quality products at better prices, especially given the numerous alternatives that exist. Moreover, these shares do not reflect the significant role that multi-homing by advertisers and publishers plays in constraining Google. Advertisers frequently use multiple different ad buying tools and bid into multiple different exchanges to purchase display ads. Publishers likewise use multiple different exchanges to sell their ad inventory. The implication of frequent multi-homing in ad tech is that Professor Gans' market share figures understate the competitive significance of Google's competitors and overstate the difficulty customers have in diverting ad spend or inventory among different ad tech providers. The reason for this is simple. Any attempt by Google to exercise monopoly power would—at the very least—incentivize advertisers and publishers that multi-home to quickly divert ad spend and inventory toward the other

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buying tools and monetization strategies that they are already using and where returns would then be relatively more attractive.

59) ***Professor Gans' Market Shares are Incorrect and Misleading, Even Accepting His Candidate Markets.*** Notably, neither Plaintiffs nor Professor Gans conclude that Google has market power or monopoly power in their candidate market for buying tools for larger advertisers. Professor Gans incorrectly calculates Google's share in his candidate market for buying tools for small advertisers. Professor Gans calculates that Google's share (through Google Ads) begins at just under [REDACTED] in 2018, rises to [REDACTED], and then ends at about [REDACTED] in 2022. Professor Gans makes at least three errors in his calculations that result in him reporting artificially high shares even using his narrow, one-sided market framework.

60) First, Professor Gans cherry picks which companies to include in his candidate market and he includes them inconsistently throughout the period he examines. Second, because he incorrectly calculates Google's share in his candidate exchange market, he makes incorrect assumptions that undercount the number of impressions won by rival buying tools. Third, he ignores third-party data that provides a more complete picture of competing buying tools' presence in his candidate market. Once these errors are corrected, I find that Google's share in his candidate market for ad-buying tools for small advertisers is [REDACTED] in 2020 and has been declining since.

61) Professor Gans also incorrectly calculates Google's share in his candidate ad exchange market. According to Professor Gans' calculations, Google's share of the candidate ad exchange market begins at about [REDACTED] in 2018, rises to [REDACTED], and then ends at [REDACTED] in 2022. These calculations overstate Google's market share because of two errors. First, Professor Gans treats some

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impressions that third-party ad exchanges won as though Google won those impressions. Second, he fails to account for the full volume of impressions transacted by third-party ad exchanges (e.g., transaction volumes that are not observed in the Google data that he uses to calculate market shares). These errors result in Professor Gans significantly overstating AdX's market share in his narrow candidate ad exchange market. When I correct for these errors, I find that Google's share in Professor Gans' candidate ad exchange market peaks at about [REDACTED] in 2020 and has been declining since.

62) Likewise, Professor Gans' estimates of DFP's market share in his candidate ad server market are based on his erroneous use of documents. My review of the documents he relied upon indicates that they do not contain the information necessary to construct a reliable measure of Google's share of his candidate ad server market. The market shares he reports are extracted from documents, but the shares in these documents are not market shares and, even if they were, the numbers do not correspond to the candidate market he has defined.

63) ***Multi-Homing by Advertisers and Publishers is Common and Means that Professor Gans' Shares Understate the Competitive Significance of Google's Rivals.*** Data in the record reveal advertisers and publishers using Google's buying tools and ad exchange multi-home extensively with rival ad tech alternatives. When limited to the purchase of display ads in the U.S., more than 16,188 advertisers choose to multi-home using Google Ads and at least one other third-party buying tool. Professor Simonson's survey results are consistent with my independent data analyses and conclusions that advertisers frequently multi-home across buying tools. These patterns indicate that advertisers are well positioned to divert ad spend if Google were to increase price in Professor Gans' narrow candidate market for buying tools for small advertisers. Indeed, Professor Simonson's survey results indicate that



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significant percentages of small and large advertisers would substitute to display ad formats and types that Professor Gans excludes from his narrow candidate markets (including social media, video, mobile ads) if confronted with a SSNIP.

64) It also is relatively commonplace for advertisers to allocate a large share of their ad spend to non-Google ad buying tools. Approximately 62 percent of advertisers that multi-home using Google's ad buying tools and some other ad buying tools allocate at least 10 percent of their ad spending to non-Google ad buying tools, while approximately 30 percent of advertisers in that group allocate at least 50 percent or more of their ad spending to non-Google ad buying tools.

65) Many publishers also multi-home across exchanges. About 45 percent of publishers who use AdX or DFP multi-home by selling inventory across AdX and at least one other exchange, either through header bidding or Google's Open Bidding. Publishers also multi-home across different monetization strategies.

66) ***Data are Inconsistent with Anticompetitive Foreclosure in Professor Gans' Candidate Markets*** Data show that there is a consistently high number of third-party exchanges and demand-side platforms that are competing against Google's ad buying tools. Between June 2018 and March 2023, the number of competing third-party exchanges appearing in Google data never fell below 40 when limited to Professor Gans' narrow definition of display ads. Similarly, the average number of exchanges through which Google's AdX and DFP publishers sell display ads (narrow) has grown from about 2.0 exchanges in 2018 to about 3.7 exchanges in 2023. When limited to Professor Gans' narrow definition of display ads, the aggregate volume of impressions transacted by third-party exchanges is larger than the total volume of impressions that AdX transacts from advertisers using Google Ads. Further, the number of

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demand side platforms available to advertisers between June 2013 and March 2023 has hovered between 82 and 172 when limited to Professor Gans' narrow definition of display ads. In addition, the data show an increase in the number of exchanges used by AdX and DFP publishers to purchase display ads (narrow) from 40 in May 2020 to 48 in March 2023. [REDACTED]

[REDACTED]. These patterns—along with other data on output, prices, and quality—do not support Professor Gans' claims that Google's alleged conduct is anticompetitive.

67) ***Professor Gans Inappropriately Excludes Important Constraints on Google from his Candidate Markets.*** Professor Gans excludes display ad formats and types from the way industry participants and eMarketer define display ads (e.g., to include video, in-app, social media ads, as well as ads negotiated through direct deals). I find that Professor Gans' omission of these display ads excludes significant competitors such as Meta, Amazon, Microsoft, and TikTok that clearly constrain Google's conduct. These omissions materially impact Professor Gans' calculations of Google's market shares that he uses to incorrectly infer that Google has monopoly power. Professor Gans' market share calculations overstate Google's market power because they exclude constraints to which advertisers, publishers, or internet users could substitute if Google attempted to exercise monopoly power.

68) When Professor Gans' narrow definition of display ads is replaced with the way eMarketer defines display ads, Google's market shares become much smaller than those calculated by Professor Gans. Google Ads and DV360's combined share in a market for ad buying tools has remained relatively flat over time and currently stands near [REDACTED] of ad spend. Similarly, when display ads are viewed

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consistent with eMarketer's use of the term, Google's share in a market for ad exchanges has consistently been below [REDACTED] of ad spend and has been falling in recent years.

69) ***Google Does Not Have Monopoly Power as a Multi-Sided Transaction Platform.*** Failure to consider indirect network effects and Google's integration of ownership and functionality across the ad tech stack leads Professor Gans to faulty conclusions regarding monopoly power. To analyze the market power of a multi-sided transaction platform, one must consider the indirect network effects and interplay among all groups (e.g., publishers, advertisers, and internet users) and recognize that these links necessarily limit market power. It is my opinion that it is more appropriate to compute a single measure of Google's market share of display ad transactions across the entire ad tech stack than to calculate shares separately for each of Professor Gans' candidate markets. Professor Gans has not done this and therefore has not reliably examined whether Google has monopoly power.

70) Google has a modest share of a multi-sided transaction platform market for matched display ad impressions. Because Google's multi-sided platform is integrated across components of the ad tech stack and also competes against other integrated platforms, as well as against platforms that do not operate all three components of the ad tech stack, the best measure of Google's market share is to calculate its share of spending on all display ad transactions. By that measure, Google's market share has declined from over [REDACTED] in 2014 to about [REDACTED] in recent years. Even this measure overstates the market power of a high-quality platform (like Google) that may win business by offering a higher quality product to customers.

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**D. Industry Outcomes are Consistent with Integration of the Ad Tech Stack Benefiting Customers (Section VIII & IX)**

71) Plaintiffs and their experts allege that Google's management of its ad tech stack as an integrated technology has harmed competition. However, economic theory teaches that integration of a supply chain often entails procompetitive benefits to customers, including downward pricing pressure and enhanced quality. My analysis shows that industry outcomes are consistent with these anticipated benefits: Google's management of its ad tech stack as an integrated whole benefits advertisers, publishers, and users alike.

72) First, integration results in lower prices for complementary elements in the ad tech stack than would arise if each element of the ad tech stack were managed by independent operators. This is because an integrated firm that raises the price of one component of its ad tech stack may induce lower demand for other components of its ad tech stack, thereby reducing the profitability of the initial price increase. Google, as an operator of an integrated ad tech stack, has an economic incentive to consider the effects its decisions about one component of its ad tech stack have on the other components of its ad tech stack. Professor Gans fails to consider that, if an integrated firm raises the price it charges publishers for serving ads on its ad server, it will make less money from publishers on its ad exchange. Likewise, Professor Gans fails to consider that, if a vertically integrated firm raises the price it charges advertisers for buying ads on its buying tools, it will make less money on its exchange because the reduction in advertisers results in lower revenues from matches on the exchange. These effects are different from indirect network effects (which also result in lower prices), and further reduce an integrated firm's incentives to raise prices.

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73) Second, integrated firms have an increased incentive to invest in demand-enhancing innovations. In considering whether to undertake an investment, a non-integrated firm would consider only whether increased demand from its direct customers (either publishers or advertisers) would make the investment profitable, whereas an integrated ad tech firm has an economic incentive to consider whether these investments result in positive externalities to the other components of its ad tech stack. For example, investment in an innovation that increases the quality of Google's buying tools results not only in increased volume on its buying tools but also can increase volumes through its exchange and ad server, through competition on the merits. As compared to a non-integrated firm, Google therefore has enhanced incentives to invest in quality-enhancing features and improvements.

74) Similarly, an integrated firm has enhanced incentives to make specific investments to improve interoperability of its products as compared with a non-integrated firm. An independent ad server and independent ad exchange could each see benefit in making quality-improving investments toward greater unification and interoperability, but the benefit to the ad server operator or ad exchange operator alone may be insufficient to justify the requisite investment. Or the ad server operator may perceive that making specific investments to enhance interoperability with a particular ad exchange could subject it to opportunistic "hold up" by that ad exchange in post-investment negotiations (or vice versa). Vertical integration eliminates these frictions and enhances incentives to make specific investments in quality-improving technical integrations. Consistent with economic theory, Google's investments in research and development increased following the integrated ownership of an ad server and ad exchange, and Google's investments in its integrated technology are ongoing. Google's investments have resulted in ad tech that is often considered best-in-class and have improved quality by increasing click-through rates, improving safety features, and decreasing spam.

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75) Professor Gans ignores these procompetitive benefits of integration and instead asserts that integration was the root of the anticompetitive harm that Plaintiffs allege. But Professor Gans fails to provide any reliable economic evidence that integration or Google's business practices harmed publishers, advertisers, or users. My analysis demonstrates that integration provided procompetitive incentives, and that Google's business practices had legitimate business rationales and benefited customers through increased functionality and the mitigation of externalities.

**E. Google Did Not Anticompetitively Tie DFP to AdX (Section X)**

76) Professor Gans claims that Google tied its ad server (DFP) to its ad exchange (AdX) by using its ad exchange's purported monopoly power to coerce publishers to license its ad server. I examine Professor Gans' claims and find that he fails to provide any reliable economic analysis to support his conclusion that Google tied DFP to AdX, or that the alleged tie foreclosed rivals and harmed publishers. To the contrary, my review of data and the record shows that Google's integration of AdX and DFP was beneficial to publishers and that publishers were not coerced into using DFP but freely choose to use what they viewed as a superior tool to those offered by rivals. I conclude that Professor Gans' claims about Google's purported anticompetitive tie suffer from several errors.

77) First, Professor Gans fails to provide a coherent economic framework for evaluating the alleged tie between AdX and DFP. Tying is a ubiquitous business practice in highly competitive markets. It is common for complementary products or features to be combined over time as customer demands and product features evolve. That is because tying often unlocks procompetitive benefits. But some types of tying can be anticompetitive, and so it is important to be able to distinguish procompetitive and anticompetitive ties. Anticompetitive ties arise when higher prices (or lower quality) for the tied product

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stem from depriving rivals of a critical mass of customers for reasons unrelated to the procompetitive benefits of the tie. Professor Gans ignores this economic framework. He provides no evidence of higher prices or lower quality for DFP, so there is no economic foundation for his claims that Google's alleged tie was anticompetitive. When I examine the evidence, I find that Google's deeper integration of DFP and AdX resulted in higher publisher revenue coupled with flat or declining prices.

78) Second, Professor Gans argues that a tie exists because publishers can only use AdX if they also agree to use DFP. But what Professor Gans characterizes as a tie between AdX and DFP is instead a relabeling of Google's procompetitive integration of its ad tech stack. Data and the record do not support a theory that publishers were forced to use DFP to gain access to AdX. Instead, because publishers could and did access AdX without DFP, their choice to use DFP indicates that they preferred it over other options, likely because it was a high-quality product offered at a low price. Something other than access to AdX must have been driving many publishers to choose DFP because [REDACTED] of publishers using DFP do not use AdX at all. Further, [REDACTED] of impressions on AdX come from non-DFP sources, and on average [REDACTED] of publishers on AdX are non-DFP publishers in a given month, showing that a publisher does not need to use DFP in order to use AdX. Together, these data are inconsistent with Professor Gans' claims that publishers were coerced to use DFP as a condition of accessing AdX.

79) Third, while Professor Gans argues that Google could impose its tie because publishers viewed AdX as a "must-have" exchange in order to access the advertisers using Google Ads, the data are inconsistent with that claim. Professor Simonson's survey results as well as my own analysis of data in the record show that advertisers' multi-homing with third-party buying tools mean that publishers can

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and do access the ad spend of Google Ads advertisers without Google Ads. Documents and publicly available information also show that Google allowed publishers to use third-party ad servers to reach bids from Google Ads. For instance, since June 2016, approximately [REDACTED] in ad spend has gone through third-party exchanges. In fact, the amount transacted monthly by U.S. advertisers on Google Ads through third-party exchanges is significant, having grown from [REDACTED] in June 2016 to [REDACTED] in January 2023, providing further evidence that advertisers using Google Ads were accessible from non-Google exchanges.

80) Fourth, Professor Gans claims that Google only allowed publishers that license Google's ad server to receive real-time bids from its ad exchange. It is important to note that this claim is not that publishers could not receive access to AdX advertisers (which they could, as the data described above demonstrates), but only that they could not receive *real-time bids* from AdX. That distinction is significant because Plaintiffs and Professor Gans do not claim that real-time bids from AdX are a distinct product to which DFP is being tied. Indeed, Professor Gans defines a relevant market for ad exchanges generally, not for real-time bids from Google's ad exchange in particular. In reality, real-time bidding is simply a discrete feature available to publishers that license DFP. A feature that a company adds to a product to attract customers reflects competition, not a product for purposes of tying analysis. There is nothing unusual about a firm providing a feature that works more efficiently with its own tools than with third-party tools.

81) Fifth, Professor Gans argues that Google contractually tied DFP to AdX by providing access to both through a single contract (sometimes referred to as the DRX contract). But he provides no evidence that signing a DRX contract prevented AdX publishers from using third-party ad servers. I find



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that the contracting change did not reduce publishers' choices; rather, it improved functionality by providing more seamless management of inventory.

82) Sixth, even if one were to assume that access to real-time bidding is a distinct product and that the integration of AdX and DFP constitutes a tie, there is no evidence that the alleged tie foreclosed rival ad servers and harmed publishers. Professor Gans offers no evidence of output declining or prices increasing as a result of the alleged tie. To the contrary, I find that:

- a. Ad server fees did not increase as a result of the alleged tie. Publisher fees either were flat or declined during the time of the alleged tie. Without an increase in prices, there is no reliable evidence that Google anticompetitively foreclosed rivals in a way that harmed publishers.
- b. The alleged tie did not foreclose competition among publisher ad servers. If access to AdX caused publishers to adopt DFP, one would expect those publishers adopting DFP to depend on AdX to sell their inventory. But I find that [REDACTED] of publishers who use DFP never use AdX. And while DFP publishers using AdX account for most of the impressions served through DFP, the DFP publishers who do use AdX sell a significant portion—[REDACTED]—of their impressions somewhere other than AdX.
- c. The alleged tie could not have foreclosed competition among publisher ad servers. Only a very small set of publishers using DFP—at most [REDACTED]—could have been impacted by the alleged tie. For these publishers, only [REDACTED] of their impressions were sold through AdX. The percentage of publishers and impressions potentially

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impacted is small. Professor Gans provides no economic analysis to establish that rivals were deprived volumes or that rival ad servers were economically foreclosed from competing.

83) My review of data and the record is more consistent with publishers willingly adopting DFP due to its combination of high quality—which in large part stems from the fact that Google has designed DFP and AdX to work together—and highly competitive low prices. Customer surveys also indicate that they prefer to partner with Google.

84) In sum, Google’s high-quality DFP offering combined with Google’s low pricing (in most cases, free) provided ample economic incentives for publishers to adopt DFP as their publisher ad server. The record does not support an economic opinion that publishers were required to use DFP to gain access to AdX. And data show that, even if Google’s integration of DFP and AdX is viewed as a tie, it would have only impacted a small number of publishers and therefore could not have plausibly foreclosed rival ad servers.

**F. Google Did Not Anticompetitively “Steer” Inventory to AdX (Section XI)**

85) Professor Gans claims that Google implemented various restrictions with respect to its ad server tool that harmed competition in his candidate ad exchange market by “steering” publishers and advertisers towards Google’s products at the expense of rivals’ products.

86) What Professor Gans characterizes as restrictions actually had a legitimate business rationale and were procompetitive features and business practices that benefited publishers and advertisers and did not anticompetitively foreclose rivals. The features and practices that Professor Gans

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examines are: (1) Unified Pricing Rules, (2) Dynamic Allocation and Enhanced Dynamic Allocation, (3) redacting auction reports, and (4) line item capping. Professor Gans' analysis of each of these programs is flawed. Professor Gans fails to consider the effects of the challenged conduct on both the publisher and advertiser sides of the market. Even for the aspects Professor Gans does consider, his analysis is insufficient to show market-wide impact to either advertisers or publishers—let alone net harm across advertisers and publishers. Professor Gans' incomplete analyses lead him to mistakenly conclude that each innovation was anticompetitive, when each actually represented competition on the merits. Indeed, competitors to Google have implemented innovations similar to many of the improvements that Plaintiffs' challenge as anticompetitive.

87) ***Unified Pricing Rules (UPR).*** UPR was a new feature that Google created to provide a unified interface for setting price floors that applied equally to the AdX auction and to auctions run by third-party exchanges. UPR was implemented in connection with Google's shift to a unified first-price auction, which eliminated reasons for publishers to set different floors for AdX than other exchanges. UPR reflects competition on the merits, and some of Google's competitors similarly require uniform pricing floors.

88) Professor Gans claims that Google introduced UPR to increase transactions on its own exchange and reduce competitive pressure from rival exchanges, thereby harming competition in his candidate market for ad exchanges and candidate market for buying tools for large advertisers. While Professor Gans throughout his report faults Google for not treating its rivals on equal terms, in his discussion of UPR he argues exactly the opposite and criticizes Google for implementing uniform rules. I find that Google's implementation of UPR had a legitimate business rationale and was a procompetitive

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feature that simplified floor setting procedures and mitigated opportunistic and inefficient behavior that harmed advertisers (and, because of indirect network effects, harmed other publishers and the value of display ads ecosystem as a whole). The data do not suggest there was any reduction in output in the candidate markets for ad exchanges and large advertiser buying tools, and therefore do not support a finding that UPR foreclosed competitors.

89) Professor Gans fails to take into account the effect of UPR on advertisers as well as publishers. UPR benefited advertisers because it prevented opportunistic publishers from squeezing surplus from advertisers by setting different price floors for different exchanges to fish for the highest price. This fishing behavior created a situation in which advertisers could unknowingly bid against themselves multiple times—and ultimately overpay—for an impression. UPR mitigated the effects of multi-calling and reduced self-competition, benefiting advertisers.

90) Professor Gans’ conclusions about UPR rely on incomplete data regarding one publisher. An anecdote regarding a single publisher is insufficient to establish broader harm to publishers. For example, I show that another publisher had a completely different experience over the same period. The weight of the data and documents in this case show that most publishers were not harmed by UPR. UPR affected only a small fraction of publishers, and a minority of publishers were dissatisfied.

91) Professor Gans claims that UPR harmed competition in his candidate ad exchange market because it drove transactions to Google and away from rivals. He also claims that UPR harmed competition in his “complementary market” for large advertiser buying tools because it allowed Google to clear more transactions. But Professor Gans offers no evidence that UPR harmed customers or competitors in such markets. The data instead shows that UPR (alongside the shift to a unified first price

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auction) had the overall effect of increasing output in Professor Gans' candidate markets, rather than decreasing output by foreclosing rivals. He also does not offer any evidence that UPR resulted in higher prices. That is because the price that Google charges publishers in the alleged market for ad exchanges—the AdX revenue share—has been flat or decreasing over time, as have prices for DV360 in the candidate large advertiser buying tool market. In sum, there is no evidence to support Professor Gans' conclusions that UPR foreclosed Google's rivals and harmed competition.

92) ***Dynamic Allocation (DA) and Enhanced Dynamic Allocation (EDA)***. DA and EDA were innovations introduced into DFP that allowed publishers to improve revenue by accessing real-time bids from AdX. Prior to Google's move to a unified first-price auction, DA allowed a publisher to get real-time bids from AdX and, if higher than the anticipated value attributed to the publisher's indirect programmatic demand sources, serve the AdX advertisement; EDA built on DA by enabling indirect demand to compete for impressions that otherwise would have been reserved for guaranteed direct deals. DA and EDA reflect competition on the merits, and several other publisher ad servers have implemented similar optimizations or features.

93) The record shows that DA and EDA were procompetitive; these innovations improved the efficiency of the allocation of ad impressions to advertisers, benefiting publishers and advertisers alike. For example, DA allowed publishers to earn greater revenues by selling inventory on AdX when AdX was able to provide the publisher with a better price than what the publisher expected to receive from other demand sources that it had configured in its publisher ad server. Similarly, EDA worked to increase publisher revenue and would also tend to increase allocative efficiency to the benefit of advertisers as a whole. Advertisers transacting indirectly benefited from allocation of impressions based on their

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valuation rather than the arrival time of the impression (the pre-EDA allocation mechanism), and it is unlikely that harm to advertisers transacting at least some of their impressions directly (if any) would have outweighed that benefit—advertisers can negotiate direct deals to ensure they are receiving ad impressions that they value.

94) Nor does the record or data support a conclusion that that DA or EDA harmed competition among ad exchanges. To the contrary, publishers using DFP could and did sell inventory via other ad exchanges under DA. If a publisher preferred a non-AdX demand source, the publisher could preference that demand source, and therefore a high price floor for AdX to beat to win an impression—making it less likely that an AdX bid would be high enough to win an impression instead of that demand source. EDA also made guaranteed reservation ad inventory available to other (non-AdX) demand sources, and data from Google indicate that third-party exchanges bidding through header bidding likely benefited from EDA in the same way that Plaintiffs allege AdX benefited from it.

95) Plaintiffs’ experts’ opinions that DA and EDA were anticompetitive are speculative and not supported by the data. None of Plaintiffs’ experts conduct any economic analysis to demonstrate that DA or EDA harmed competition. Instead, Professor Gans misinterprets Google’s incentive to increase AdX’s win rate as “anticompetitive steering.” However, an incentive to win more transactions and grow revenue is insufficient to support a conclusion of anticompetitive conduct. A firm’s win rate and revenue may increase for procompetitive reasons—e.g., by delivering benefits to customers as the record suggests for DA and EDA—and Professor Gans makes no attempt to distinguish between effects of procompetitive and anticompetitive business practices in his analysis of AdX revenue and win rates.

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96) ***Line Item Capping.*** Publishers create “line items” in Google’s ad server to identify the types of ad inventory that they will offer to various sources of demand. For some implementations of header bidding, publishers created separate line items for every possible bid that they might receive from a header bidding exchange, greatly increasing the total number of line items.

97) The record indicates that Google established limits on the number of line items—capping publishers at 61,000 active line items per publisher network—to prevent excessive line items from reducing the performance of its system. The limit was imposed after one publisher had 8 million line items and strained Google’s system. Professor Gans asserts that line item capping harmed competition in his ad exchange market because it restricted header bidding exchanges. But line item capping had a legitimate business rationale and was a procompetitive business practice that mitigated negative externalities to preserve the health of Google’s system and prevent performance issues that could impede publishers’ ability to sell ad inventory.

98) Professor Gans’ conclusions about line item capping are not based on any data analysis showing that line item caps impacted competition from header bidding. He shows no impact on price or competition. Nor does Professor Gans point to any documents that demonstrate actual reductions in market outcomes stemming from line item caps. His conclusion of market impact appears to be based solely on the isolated experiences of four publishers. Contrary to Professor Gans’ conclusions, the data show that line item caps did not reduce header bidding transactions by publishers who were close to the line item cap. Such transactions doubled between January 2019 and January 2022, while Open Bidding transactions by those same publishers declined. Publishers who were using a number of line items close to the cap therefore neither decreased their reliance on header bidding nor increased their reliance on

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Open Bidding. These economic findings directly contradict Professor Gans' claims that line item capping foreclosed competition from header bidding and forced publishers to switch to Open Bidding.

99) ***Redaction of Auction Reports.*** The record indicates that Google's decision to redact certain data from auction reports had a legitimate business rationale and was a procompetitive choice to protect user privacy by preventing publishers from using unredacted data to create detailed individual user profiles. If users perceive the internet as unsafe, they are likely to decrease their internet usage. Keeping users on the internet benefits advertisers and publishers alike—as well as users. This is demand-enhancing and procompetitive.

100) Moreover, despite these privacy related redactions, the record indicates that Google provides publishers with a wealth of granular information that allows publishers to compare exchange performance effectively.

101) Finally, I find that only a small minority of U.S. publishers access auction reports, including the ones that are subject to Google's redaction. With only a limited number of publishers using Google's auction reports, there is no evidence to support Professor Gans' claims that changes to those reports had anticompetitive effects on the ad exchange market as a whole. To the contrary, data show robust increases in header bidding, which is inconsistent with the economic mechanism through which this business practice allegedly steered customers to Google.

**G. Google Did Not Engage in Anticompetitive “Auction Manipulations” (Section XII)**

102) Professor Gans characterizes Project Bernanke (“Bernanke”) and Dynamic Revenue Share (“DRS”) as “auction manipulations” that made it harder for non-Google incumbents and new entrants to



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compete at various levels of the ad tech stack. I explain why Professor Gans' analyses of these programs are flawed and do not support a conclusion that these features harmed competition or customers. I instead conclude that Bernanke and DRS had a legitimate business rationale; the record indicates that they were procompetitive innovations that increased the quality and frequency of ad matches and benefited publishers and advertisers.

103) ***Project Bernanke***. Professor Gans asserts that Project Bernanke made it difficult for rival tools to provide competing services in his candidate markets for buying tools for small advertisers and ad exchanges by shifting transactions to Google's tools. But I find that Bernanke had a legitimate business rationale and was a procompetitive buy-side optimization that enabled advertisers to win impressions they valued.

104) The record indicates that Bernanke aimed to increase the rate at which Google Ads advertisers won AdX auctions while maintaining Google Ads' average margin at [REDACTED]. Up until 2019, AdX conducted second-price auctions, so the winner paid the higher of the second-highest bid and the publisher's price floor. During that period, Google Ads submitted high and low bids to AdX based on the values of the highest and second-highest bidders in its internal auction, and Bernanke adjusted both of those bids to maximize the value of auctions won by its advertisers. The ultimate effect was that advertisers won impressions they otherwise would not have but still paid no more than they valued the impressions. A later version of the feature (called Global Bernanke) similarly helped Google Ads advertisers win impressions with higher rates of user engagement.

105) Professor Gans provides no empirical evidence to support his assertions that Bernanke harmed publishers, advertisers, and Google's rivals, and those assertions are inconsistent with the record.

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I find that Bernanke benefited advertiser and publisher customers. Documents indicate that Google assessed that Bernanke was responsible for increasing its advertisers' win rate by [REDACTED] and increased publisher revenue by [REDACTED].

106) Google data also are inconsistent with Professor Gans' assertion that Bernanke foreclosed ad buying tool competition. Google AdX data indicate that the share of all AdX open auction impressions won by Google Ads buyers was decreasing during and after the implementation of Bernanke. These patterns indicate that Bernanke did not foreclose Google Ads' rivals.

107) Professor Gans fails to recognize that innovation and investments in features like Bernanke are part of the competitive landscape in ad tech. And he ignores that Google was not in a unique position to introduce features like Bernanke. The record indicates that Google developed Bernanke without leveraging any information that did not already reside with Google Ads, and Google Ads' rivals could have implemented similar programs—and in fact, some rivals did offer competing solutions.

108) *Dynamic Revenue Share (DRS)* DRS had a legitimate business rationale and was a procompetitive sell-side optimization that enhanced competition on the merits between Google and other exchanges. The record indicates that DRS was an optional publisher feature that allowed AdX to compete for marginal impressions by adjusting the fees Google charges publishers. The record indicates that the result was increased publisher revenue and quality of matches through growth in the number of publisher impressions that were matched with advertisers. Professor Gans claims that DRS allowed Google to leverage its ad server to foreclose rival ad exchanges and harm competition in his candidate market for ad exchanges. But Professor Gans' conclusions are flawed because he confuses enhanced competition

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facilitated by DRS with anticompetitive foreclosure. I find DRS was a legitimate business innovation that allowed publishers to sell more inventory.

109) First, the record indicates that DRS was a procompetitive innovation that increased publisher revenue and overall ecosystem welfare by expanding the number of impressions matched with a buyer. But for DRS, publishers likely would not have filled as much of their ad space. DRS creates value for publishers and advertisers by enabling transactions that both advertisers and publishers value that may otherwise go unfilled or filled with house ads (i.e., ads that do not generate revenue). Advertisers and third-party buying tools also benefited from DRS as it increased their match rates and revenue. For example, the first version of DRS resulted in a match rate increase of [REDACTED] for AdX publishers selling to third-party DSPs. This increase in newly matched queries led to a [REDACTED] increase in spending on AdX from third-party DSPs. A higher match rate is in the best interest of a third-party DSP as it means more advertiser budget is successfully spent, which results in more total revenue for the DSP from fees charged to advertisers.

110) Second, I show that Professor Gans' data analyses of DRS contain three material errors that result in him drawing incorrect conclusions. When I correct these errors, the patterns that Professor Gans claims support his conclusions that DRS is anticompetitive are no longer present. For instance, Professor Gans' claims that the AdX revenue shares increased above [REDACTED] after the launch of one version of DRS. But these results disappear when I correct Professor Gans' data errors.

111) Third, Professor Gans' assertion that DRS allowed Google to foreclose competition from rival ad exchanges by engaging in predatory pricing (i.e., money-losing pricing) makes no economic sense. Professor Gans fails to show that Google lost money serving publishers when DRS was in effect.

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And that is not surprising because DRS occurs specifically when there are positive economic profits to be earned from an impression that would otherwise go unfilled. Moreover, DRS worked by maintaining Google's profitable [REDACTED] revenue share overall even though there was variability from one transaction to another.

112) Fourth, Professor Gans' conclusion that DRS harmed competition in his candidate ad exchange market ignores the fact that DRS only applied to a small subset of auctions. While I find that DRS was beneficial to publishers, advertisers, and Google (and hence, is competition on the merits), the additional volume of impressions that AdX was able to win as a result of more efficient price competition would have been insufficient to foreclose competition in Professor Gans' candidate ad exchange market. Combined with the fact that DRS allowed publishers to sell impressions that would otherwise go unsold, it is highly unlikely that DRS harmed rivals' ability to compete with AdX.

113) In sum, data and the record reject the theory that DRS foreclosed rival ad exchanges and reduced competition in Professor Gans' candidate ad exchange market. DRS is best viewed as a procompetitive innovation through which Google programmatically adjusted the AdX revenue share to permit publishers to sell inventory that might otherwise go unsold and that enabled advertisers and third-party buying tools to increase their match rates.

**H. Professor Gans Does Not Demonstrate that Project Poirot, the Facebook Agreement, or Any Other Google Conduct Harmed Competition (Section XIII)**

114) Plaintiffs assert that additional conduct—including Project Poirot ("Poirot"), Google's network bidding agreement with Facebook, and reserve price optimization—was anticompetitive. However, Plaintiffs' experts have not concluded that this conduct harmed competition. I find that Poirot,

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Google's agreement with Facebook, and reserve price optimization all had a legitimate business rationale and were business decisions that did not harm competition. Nor did Google's conduct otherwise harm competition or innovation.

115) ***Project Poirot.*** Google documents indicate that it launched Poirot to increase DV360 advertisers' surplus by helping them bid more efficiently into non-second-price auctions. Consistent with this purpose, documents indicate that Poirot increased advertiser surplus by [REDACTED] and that advertisers had on average an increase of [REDACTED] in return on investment in terms of clicks per dollar, conversions per dollar, and active view metrics following the implementation of Poirot. Advertisers could choose not to utilize Poirot, but 99 percent of eligible bidders chose to keep Poirot enabled. Google data are inconsistent with Professor Gans' claims that Poirot foreclosed competition from third-party exchanges. Further, rival exchanges and DSPs also offered similar bid-optimization programs, suggesting that any perceived scale advantages are not significant enough to foreclose competition from rivals.

116) ***Project Elmo.*** Similar to Poirot, documents indicate that Google developed Project Elmo ("Elmo") to protect advertisers from inefficiencies attendant to programmatic buying. Specifically, Elmo addressed the problems associated with exchanges or publishers sending multiple queries for the same impression. Contrary to Plaintiffs' allegations, the data and the documents are not consistent with Elmo being used to harm header bidding or foreclose rival exchanges from Google demand. Instead, they show that Elmo had different effects on exchanges based on their behavior: Exchanges that made multiple calls for the same inventory lost revenue, whereas "cleaner" exchanges saw revenue increases.

117) ***FAN Network Bidding Agreement.*** Professor Gans cites no evidence that the agreement between Facebook and Google limited the use of header bidding or otherwise harmed competition,

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instead basing his opinions exclusively on his speculative interpretation of documents. Further, the data are inconsistent with the allegation that the agreement harmed competition.

118) ***Reserve Price Optimization (RPO)***. Plaintiffs allege that non-Google exchanges, publishers, and advertisers are harmed by Google's RPO program. None of Plaintiffs' experts finds that RPO harmed competition. To the contrary, although Professor Weinberg asserts that RPO led to increased ad prices for advertisers, it typically increased publisher revenue and had an "indeterminate" effect on AdX, he conducts no analysis on data to demonstrate his conclusions. My assessment of the record evidence is that RPO generated improved yields for publishers. RPO also reduced the complexity associated with manually setting price floors, which has positive effects on publishers, advertisers, and users through indirect network effects.

119) ***Privacy Sandbox***. Plaintiffs allege that Google's proposal to deprecate third-party cookies in chrome and shift to proprietary tracking mechanisms, known as "Privacy Sandbox," would "raise barriers to entry and exclude competition in the exchange and ad buying tool markets." However, none of Plaintiffs' experts has demonstrated harm to competition. This is not surprising, as the most recent information about Privacy Sandbox indicates that Google is not moving forward with the deprecation of third-party cookies. Additionally, I note that documents indicate that Privacy Sandbox was subject to close regulatory scrutiny and oversight as Google entered commitments with the U.K. Competition and Markets Authority to ensure that any implementation of Privacy Sandbox would satisfy its competition concerns.

120) Finally, data are also inconsistent with Professor Gans' allegations that Google's business practices, taken as a whole, "killed header bidding," foreclosed competition, or otherwise prevented

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rivals from accessing customers. Data and documents demonstrate that Google did not kill header bidding or hamper publishers' ability to sell inventory through rival exchanges—rather, header bidding has grown. In addition, Google's Open Bidding innovation provided a direct means for publishers to sell inventory using rival exchanges. This means that publishers have more choices to work with rival ad exchanges to sell their inventory. Google's introduction of Open Bidding was procompetitive because this innovation provided improved service to ad exchanges, advertisers, and publishers. By 2021, the competition that Professor Gans claims Google had “killed”—i.e., header bidding—accounted for more of publishers' impressions than the portion of AdX transactions that Professor Gans claims to be the reason that AdX was a “must-have” for publishers—i.e., Google Ads.

**I. Professor Pathak's Proposed Remedies Would Benefit No One and Likely Harm Customers (Section XIV)**

121) Professor Pathak's structural remedies are based on Professor Gans' analysis of competitive effects, which ignores the pro-competitive benefits that Google's operation of an integrated ad tech stack provides advertisers, publishers, and internet users. Assuming Professor Gans is correct and Google has monopolized his candidate markets for ad exchange, ad server markets, and buying tools for small advertisers, Professor Pathak's structural remedy of breaking ownership of AdX and DFP into two separate entities would create two separate entities, each charging a markup on its product.

122) Professor Pathak's structural remedy would likely result in customers paying higher fees than they are currently paying to use AdX and DFP. As an integrated, multi-sided transaction platform, Google can charge lower fees because of what economists refer to as “the elimination of double-marginalization” and Google's procompetitive incentives to account for indirect network effects within and across its ad tech stack. Furthermore, operating AdX and DFP as independent units moving forward

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would diminish the incentives of both to make the ongoing investments necessary to improve the quality and functionality of each stand-alone product.

123) Moreover, Professor Pathak's notion of "restoring competition" is inconsistent with his structural remedy, which deprives customers of the "competitive" quality and procompetitive benefits of Google's integration such as thick markets and trustworthy platforms. Effectively, Professor Pathak's proposal does not restore quality at a competitive level. Professor Pathak's proposal to break ownership of AdX and DFP into two separate entities would require eliminating all of the improvements and features Google has developed for AdX since relaunching it in 2009. And competitive, stand-alone prices for DFP would almost certainly be above current levels.

124) Professor Pathak's analysis confuses "conflicts of interest" with Google's incentive (as an integrated multi-sided platform) to efficiently internalize externalities across different components of the ad tech stack as well indirect network effects among advertisers, publishers, and users. Divestiture would cause such externalities to reemerge, which would harm customers and users, and would eliminate the benefits of integration that accrue to customers and users. Divestiture would cause negative externalities to reemerge, which would harm customers and users, and would eliminate the benefits of integration that accrue to customers and users.

125) Professor Pathak's behavioral remedies would essentially allow Google's rivals to free ride off past investments in the integration of AdX and DFP and to free ride off any future investments Google makes to improve AdX. In theory, if a regulator had the information necessary to set efficient prices under which rivals would pay Google for the right to connect their ad servers to AdX, it might be possible to preserve Google's incentives to make the same investments it would make in the absence of these



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behavioral remedies. But it is highly unlikely that a regulator or any other party has the information necessary to specify in advance such terms.

126) Professor Pathak's structural and behavioral remedies could result in unintended consequences, since restricting the manner in which Google can compete may reduce the vigor with which it competes against other companies. In presenting his "remedies," Professor Pathak fails to acknowledge any costs associated with enacting them, thus implicitly assuming, without basis, that there are none. But his proposed remedies impose their own costs on the welfare of advertisers, publishers, and users.

**V. OVERVIEW OF COMPETITION IN THE AD TECH INDUSTRY**

127) This section provides a high-level overview of the complex ad tech industry and introduces some of the economic factors that impact competition and the welfare of industry participants.

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**A. The Ad Tech Industry and Its Stakeholders**

128) “Ad tech” is technology that facilitates the buying and selling of digital advertising. Professor Gans<sup>2</sup> focuses on three specific components of ad tech: publisher ad servers,<sup>3</sup> ad buying tools,<sup>4</sup> and ad exchanges.<sup>5</sup>

129) Publishers of digital content (e.g., a website or an app) can choose to sell advertising space (“inventory”)<sup>6</sup> alongside their content. If they do, every user<sup>7</sup> who navigates to the content provides a

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<sup>2</sup> Gans Report, at ¶120. (“I find there are four relevant product markets: (1) the market for publisher ad servers used for open web display advertising inventory, (2) the market for ad exchanges for transacting indirect open web display advertising, (3) the market for ad buying tools for small advertisers for buying open web display advertising space, and the market for ad buying tools for large advertisers for buying open web display advertising space.”). Note that Professor Gans references four markets, as he lists ad buying tools for small and large advertisers separately.

<sup>3</sup> Ad servers are tools that “allow publishers to manage ad slots on their websites and display ads that have been sold directly to advertisers via direct campaigns” and “act as a management platform helping to decide which [indirect ads] to serve in their ad slots.” (Amazon Ads, “What is adtech and why is it important?” available at: <https://advertising.amazon.com/library/guides/what-is-adtech>. Accessed April 16, 2024). They are also “responsible for targeting, i.e. making decisions about which ads to display on a website based on nuanced targeting parameters, serving them, and collecting and reporting the data (such as impressions, clicks etc.)” and are “used for inventory forecasting—i.e. [predicting] how much inventory and of what type the publisher will have available for sale in the future based on the current campaigns & traffic projections.” (Maciej Zawadziński and Mike Sweeney, “What is an Ad Server and How Does It Work?” Clearcode, July 17, 2024, available at: <https://clearcode.cc/blog/what-is-an-ad-server/>).

<sup>4</sup> While Professor Gans uses the phrases “ad buying tools for large advertisers” and “ad buying tools for small advertisers,” these terms are not commonly used by practitioners in or commentators on the industry, and the use of ad buying tools is not strictly in accordance with customer size. (Gans Report, at ¶13). In his deposition, [REDACTED] refers to a slide from a 2015 Google report, stating that “it seems to suggest that size is not the only determinant of what an advertiser might want to do.” The referenced slide discusses target use cases that apply to customers of all sizes, including the need for broad reach/access. (Deposition of [REDACTED] (YouTube) on March 30, 2021, GOOG-AT-MDL-007173623, at 72:6-13, 108:23-25; GOOG-DOJ-03238507, at -09). Instead, it is common for such tools used by ad buyers to be referred to as “demand side platforms” (or DSPs) or “ad networks.” See Publifit, “What is a Demand Side Platform (DSP) and How It Helps Publishers,” available at: <https://www.publifit.com/blog/what-is-a-demand-side-platform-dsp>. Accessed July 29, 2024; Mike Sweeney, “What Is a Demand-Side Platform (DSP) and How Does It Work?” Clearcode, January 31, 2024, available at: <https://clearcode.cc/blog/demand-side-platform/>. Accessed July 29, 2024; Criteo, “What is an ad network? A guide for advertisers and publishers,” available at: <https://www.criteo.com/blog/what-is-an-ad-network-a-guide-for-advertisers-and-publishers/>. Accessed July 29, 2024.

<sup>5</sup> “An ad exchange is a virtual marketplace where publishers and advertisers connect to buy and sell digital ad space without the need for an intermediary.” This buying and selling “happens through real time bidding (RTB) in which several participants bid on the available ad inventory. The highest bidder wins the right to display their ads on the selected ad space.” (Brock Munro, “What is an Ad Exchange and How Does it Work?” Publifit, April 15, 2024, available at: <https://www.publifit.com/blog/what-is-an-ad-exchange>).

<sup>6</sup> Adjust, “What is ad inventory?” available at: <https://www.adjust.com/glossary/ad-inventory/>. Accessed July 29, 2024. (“Inventory is the total number of ad placements or ad space a publisher has available for advertisers to purchase in order to display their advertisements.”).

<sup>7</sup> To avoid confusion with customers who “use” ad tech, I refer to those viewing ads as “users,” “internet users,” or “content viewers” and publishers and advertisers who use ad tech as “customers.”

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distinct ad opportunity (an “impression”)<sup>8</sup> for a digital advertisement to be shown to that viewer. Advertisers can choose to purchase this inventory to reach users (i.e., internet users or content viewers), with the goal of generating results from those impressions that are performance-based and have a high return on investment.

130) Every day, the behavior of users generates billions of impressions that can be sold to advertisers. Each of those sales occurs almost instantaneously (within milliseconds) so that advertisements can be shown to a particular user. These billions of transactions are possible because of complex engineering systems capable of instantaneously linking the publisher and advertiser sides of the marketplace.

131) The ad tech industry facilitates these transactions between publishers and advertisers. The industry succeeds when this process works effectively, which includes balancing often conflicting interests of advertisers, publishers, and users.

132) Ad tech is a dynamic industry that features competition between different business models for facilitating these transactions. The complexity and ongoing evolution and integration of the industry blur the lines between components of the ad tech stack.<sup>9</sup> Some ad tech companies (e.g., The Trade

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<sup>8</sup> Adjust, “What is an impression?” available at: <https://www.adjust.com/glossary/impression/>. Accessed July 29, 2024. (“An impression ... is when a user sees an advertisement. In practice, an impression occurs any time a user opens an app or website and an advertisement is visible.”).

<sup>9</sup> The ad tech stack refers to the “various ad platform and tool components that [are] used” by “publishers, advertisers, and other parties to buy, sell, and manage digital advertising.” These components include ad buying tools, ad exchanges, and ad servers, along with supply side platforms (or SSPs), which publishers use to sell ad inventory programmatically, often including robust options for publishers to control their sales. While “traditionally, ad exchanges were separate platforms that SSPs connected to,” major SSPs now integrate an ad exchange as a component in their platform. (AdButler, “What is AdTech? Basics of The Ad Tech Ecosystem Explained,” AdButler Blog, May 5, 2021, available at: <https://www.adbutler.com/blog/article/what-is-ad-tech-the-ad-tech-ecosystem-explained>). Similarly, sell side products used by publishers have also seen an expansion in functionality that blurs old product category borders. For instance, The Trade

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Desk)<sup>10</sup> primarily market their tools and services to advertisers, while others (e.g., Kevel)<sup>11</sup> market their tools and services to publishers. Some ad tech companies (e.g., Microsoft, whose ad tech stack is branded as Xandr) market their ad tech to both advertisers and publishers.<sup>12</sup> Still other ad tech companies (e.g., Meta, Google, and Amazon) compete for advertisers and/or publishers, but also use their own ad tech to sell digital advertising on their respective properties.<sup>13</sup> Economic theory indicates that even if a company exclusively or primarily uses its own ad tech in this way, its presence in the industry provides other firms

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Desk launched “OpenPath” functionality in 2022, allowing its advertisers to buy ad inventory directly from publishers without a middleman. (Seb Joseph and Ronan Shield, “‘A clean, unadulterated supply chain’: The Trade Desk on a year into its OpenPath direct deals with publishers,” Digiday, March 7, 2023, available at: <https://digiday.com/marketing/a-clean-unadulterated-supply-chain-the-trade-desk-on-a-year-into-its-openpath-direct-deals-with-publishers/>).

<sup>10</sup> The Trade Desk, “What we do,” available at: <https://www.thetradedesk.com/us>. Accessed July 29, 2024 (“Our self-serve, transparent software helps advertisers use the best available data to reach audiences on the open internet at every stage of the funnel - from awareness to engagement to conversion.”); Snowflake Blog, “How The Trade Desk Uses the Data Cloud to Thrive in the Dynamic AdTech World,” December 16, 2021, available at: <https://www.snowflake.com/blog/how-the-trade-desk-uses-the-data-cloud-to-thrive-in-the-dynamic-adtech-world/>. (“[The Trade Desk’s] self-service software helps advertising agencies and brands around the world make data-driven decisions on the digital media purchases they make on the open internet across inventory including desktop, mobile, audio, connected TV, and out-of-home advertising.”).

<sup>11</sup> OKO, “Best publisher ad servers on the market,” February 16, 2023, available at: <https://oko.uk/blog/best-publisher-ad-servers-on-the-market>. (“Publishers have come to enjoy many of the individual features that Kevel has on offer, such as the ability to fully control a campaign of any size, create functional reports, and access expert support at any time.”); James Avery, “Adzerk Raises a Series A and Rebrands to Kevel,” Kevel, December 6, 2020, available at: <https://www.kevel.com/blog/adzerk-rebrand-kevel>. (“Kevel’s mission is to provide ad serving APIs that offer publishers more freedom to build what they want; more action to start making new revenue quickly; and more humanity to monetize with ads that aren’t terrible.”).

<sup>12</sup> Xandr was known as AppNexus from 2007 to 2018, when AT&T acquired it and rebranded to Xandr. (Alyson Shontell, “Inside One Of New York’s Greatest Startup Success Stories, AppNexus,” Business Insider, November 3, 2011, available at: <https://www.businessinsider.com/appnexus-office-tour>. (“AppNexus was founded in 2007 by Brian O’Kelley and Mike Nolet.”); Ronan Shields, “AT&T Unveils Xandr, Its Newly Rebranded Ad-Tech Unit,” AdWeek, September 25, 2018, available at: <https://www.adweek.com/programmatic/att-unveils-xandr-its-newly-rebranded-ad-tech-unit/>. (“AT&T today announced the rebrand of its AdCo unit, unveiling Xandr[,] ... [which] will house all of the telco’s data-led offerings, including ... the recently acquired ad-tech unit AppNexus.”)). In 2021, Microsoft acquired Xandr from AT&T. (James Hercher, “Xandr, Formerly AppNexus, Is Now Formerly AT&T, After Its Acquisition By Microsoft,” AdExchanger, December 21, 2021, available at: <https://www.adexchanger.com/online-advertising/xandr-formerly-appnexus-is-now-formerly-att-after-its-acquisition-by-microsoft/>. (“AT&T has sold its ad tech business Xandr to Microsoft.”)). According to a 2016 Google strategy document, AppNexus had more than a 9 percent share of ad server business in the second quarter of 2016, and “AppNexus has built a sizeable footprint, with —15-20% of our ad-serving size and 1/3 of our Exchange size.” (GOOG-DOJ-04424050, at -69-70).

<sup>13</sup> Peter Westberg, “The Rise of Google, Meta, Amazon, and Youtube in Advertising,” Quartr, May 24, 2024, available at: <https://quartr.com/insights/company-research/the-rise-of-google-meta-amazon-and-youtube-in-advertising>. (“Google Ads ... allow[s] businesses to display ads in [Google] search results based on the keywords typed by users.” “[Meta’s] platforms ... provid[e] a fertile ground for advertisers looking to target specific demographics with precision.” “[Amazon] has ... develop[ed] a range of advertising products that allow businesses to place their products in front of consumers at critical moments in the shopping journey.”).

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strong incentives to offer a competitive mix of price and quality.<sup>14</sup> All of these different options compete to facilitate matches between advertisers and impressions at publishers.

133) This facilitation is important because customer groups served by ad tech firms may have conflicting interests. For example, advertisers generally prefer lower ad prices, publishers generally prefer higher ad prices, and users generally prefer fewer, but more relevant, ads. In particular:

- a. Publishers are customers who may use ad tech to sell ad space on their digital properties as a way of monetizing content. Publishers seek to attract users and have a variety of options for monetizing viewer traffic to their digital properties.<sup>15</sup>
- b. Advertisers are customers who purchase ad space on which to place digital ads to gain the attention of users. Advertisers have many options for reaching users. The typical user accesses content through a variety of different digital environments, including social media, shopping, news, blogs, and a variety of others, both via websites and via mobile apps.

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<sup>14</sup> Firms that primarily or exclusively use their ad tech to meet their own needs may satisfy the DOJ and FTC's definition of a *rapid entrant*: "Firms that are not currently active in a relevant market, but that very likely would rapidly enter with direct competitive impact in the event of a small but significant change in competitive conditions, without incurring significant sunk costs, are also considered market participants. These firms are termed 'rapid entrants.'" (Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at p. 49; see also Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, 2010, at pp. 15-16).

<sup>15</sup> In addition to selling ad space, publishers also can monetize their content through subscriptions, sale of data to third parties, affiliate links, and sponsorships. See Kean Graham, "Website Monetization Strategies For Publishers," MonetizeMore, August 11, 2021, available at: <https://www.monetizemore.com/blog/website-monetization-strategies-for-publisher/>. ("Subscription models entail charging your visitors a monthly or yearly fee for access to membership sites and exclusive, high-quality content." "When you include affiliate links on your website, you will earn a commission for each person who clicks on your affiliate link." "Sponsored Content: Publishers work with a company to create or publish promotional materials inside their website content.""). See also Eyeota, "Publishers: How to Make Additional Revenue from your Data," available at: <https://www.eyeota.com/blog/publisher-data-monetization-basics>. Accessed July 30, 2024. ("There are various ways that publishers and data owners can activate their data within the online advertising ecosystem and begin to generate revenue from it." These include: "Anonymous Data Marketplaces," "Private Data Marketplaces," and "Publisher Alliances.").

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- c. Users are not direct customers of ad tech, but are relevant stakeholders in the ad tech ecosystem, with the relevance of an advertisement to a particular user affecting the value of matching the advertisement to an impression for that user. The typical user accesses content through a variety of different digital environments, including social media, shopping, news, blogs, and a variety of others—not only through websites, but via mobile apps and connected TV (CTV).

134) Publishers that sell digital ad space have a variety of options for selling their ad inventory, including direct deals with advertisers and indirect ad sales that dynamically match advertisers to ad inventory.<sup>16</sup> Publishers also have a variety of ways they can monetize content using direct deals<sup>17</sup> and indirect ads sales.<sup>18</sup>

135) Publishers are not only free to choose whether to use ad tech to monetize content, but which ad tech to use. Some publishers use only one component of the ad tech stack,<sup>19</sup> while others use multiple

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<sup>16</sup> This matching occurs through auctions, where advertisers submit bids for the right to have their ads displayed to internet users viewing publisher content. (See Holly Shuffett, “What are Ad Auctions? The Definitive Guide,” Kevel, May 16, 2024, available at: <https://www.kevel.com/blog/ad-auctions>. Accessed July 30, 2024). Professor Milgrom has submitted a report that discusses these auctions in more detail.

<sup>17</sup> For example, publishers can use ad tech to negotiate direct sales with advertisers (e.g., “programmatic direct” deals), they can engage in bilateral negotiations with an advertiser to set the terms of a deal, and publishers and advertisers can engage third parties (i.e., agencies) to transact these deals. (AdPushup, “Programmatic Deals vs. Direct deals – Detailed Comparison for Publishers,” available at: <https://www.adpushup.com/blog/programmatic-vs-direct-deal/>. Accessed July 30, 2024).

<sup>18</sup> For example, publishers can sell ad space through open ad auctions on an exchange, through header bidding auctions among exchanges, through private auctions with curated lists of bidders, and through networks that may determine matches through means other than auctions. (Brock Munro, “What is an Ad Exchange and How Does it Work?” Publifit, April 15, 2024, available at: <https://www.publift.com/blog/what-is-an-ad-exchange>; Publifit, “How Does Header Bidding Work? Everything Publishers Need to Know,” available at: <https://www.publift.com/adteach/what-is-header-bidding-and-why-should-you-care>. Accessed July 30, 2024; Google Ad Manager Help, “Private Auctions overview,” available at: <https://support.google.com/admanager/answer/2987915>. Accessed July 30, 2024; Criteo, “What is an ad network? A guide for advertisers and publishers,” available at: <https://www.criteo.com/blog/what-is-an-ad-network-a-guide-for-advertisers-and-publishers/>. Accessed July 29, 2024).

<sup>19</sup> For example, according to Google data, Rogue Media, Tokyopop, and AboutJobs.com are websites that sell ad inventory using AdSense but do not use Google’s AdX exchange or use DFP to choose from non-Google sources of demand. CVS is a pharmacy chain

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components.<sup>20</sup> Some publishers exclusively sell ad inventory through a single ad tech provider,<sup>21</sup> while others sell inventory through multiple ad tech providers.<sup>22</sup> Publishers also are free to change ad tech providers.<sup>23</sup> Some publishers develop and use their own ad tech,<sup>24</sup> and sometimes have commercialized

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and website that appears in Google's DFP data but does not sell ads indirectly through AdX or AdSense. (These examples are identified in the backup to my report using MDL RFP 243 AdSense Backfill Data, MDL RFP 243 AdX Data, and MDL RFP 243 DFP Reservations Data).

<sup>20</sup> For example, according to Google data, NBA.com, Zillow Group, and Tennis World sell ads through AdSense and AdX and do not use DFP to choose from other (non-Google) sources of demand. Additionally, TheOnion.com, Urban Dictionary, Glassdoor, Inc., Chess.com, Long Beach Post, and The Washington Times sell ads through AdSense and AdX along with using DFP to serve ads from non-Google sources of demand (which can include header bidding exchanges, ad networks, other remnant sources, direct deals, or even non-monetized ads such as house ads). (These examples are identified in the backup to my report using MDL RFP 243 AdSense Backfill Data, MDL RFP 243 AdX Data, and MDL RFP 243 DFP Reservations Data).

<sup>21</sup> For example, the Ads.txt file posted at MIT indicates that it chooses to solely use Google to sell its ads, the Ads.txt file posted at BizBash indicates that it chooses to solely use Sharethrough to sell its ads, and the Ads.txt files posted by Amazon states, "Amazon programmatic inventory is not available for purchase through non-Amazon sellers or resellers." Reddit, Facebook, Walmart, and TikTok have similar statements. (See, e.g., Massachusetts Institute of Technology, "ads.txt," available at: <https://web.mit.edu/ads.txt>. Accessed July 22, 2024; BizBash, "ads.txt," available at: <https://www.bizbash.com/ads.txt>, Accessed July 22, 2024; Amazon, "ads.txt," available at: <https://www.amazon.com/ads.txt>. Accessed March 27, 2024; Internet Archive, "ads.txt," available at: <https://web.archive.org/web/20210517155726/http://reddit.com/ads.txt>. Accessed March 25, 2024; Facebook, "ads.txt," available at: <https://www.facebook.com/ads.txt>. Accessed April 19, 2024; Walmart, "ads.txt," available at: <https://www.walmart.com/ads.txt>. Accessed March 27, 2024; Internet Archive, "ads.txt," available at: <https://web.archive.org/web/20210517160622/http://tiktok.com/ads.txt>. Accessed March 27, 2024).

<sup>22</sup> For example, the Ads.txt file for The Washington Post indicates that it sells inventory through Google and many other providers, including Microsoft's AppNexus/Xandr, Facebook, Amazon, NBC Universal's FreeWheel, OpenX, Index Exchange, TripleLift, PubMatic, Smaato, Rubicon, and numerous others. (The Washington Post, "Ads.txt," available at: <https://www.washingtonpost.com/ads.txt>. Accessed July 22, 2024).

<sup>23</sup> Although Disney, Reddit, and Walmart have developed their own publisher ad servers, they have previously used Google's publisher ad server. (Tim Peterson, "How Disney is using its audience data and Hulu's ad tech to compete with Google, Meta and Amazon," Digiday, March 3, 2020, available at: <https://digiday.com/future-of-tv/how-disney-is-using-its-audience-data-and-hulus-ad-tech-to-compete-with-google-meta-and-amazon/>, ("[T]oday it's a combination of [Google's ad server and Hulu's ad server]. Ultimately, it will all be on the Disney ad server.")). Likewise, publishers also change the ad tech that indirectly sells their ad inventory. CNN's list of third parties authorized to sell its inventory has grown steadily from a few dozen in 2017 to several hundred lines of authorized sellers today (See Internet Archive, "ads.txt," available at: <https://web.archive.org/web/20171105043016/https://www.cnn.com/ads.txt>. Accessed April 29, 2024; Internet Archive, "ads.txt," available at: <https://web.archive.org/web/20240320192113/https://www.cnn.com/ads.txt>. Accessed July 22, 2024). Prior to severing all programmatic exchanges from its inventory, Reddit sold its inventory programmatically through many different third-party exchanges, including Google. (Internet Archive, "ads.txt," available at: <https://web.archive.org/web/20200805165649/https://www.reddit.com/ads.txt>. Accessed July 22, 2024).

<sup>24</sup> For example, Amazon, Meta, Disney, [REDACTED] For example, Disney's proprietary ad server "gives the company greater flexibility and control, in order to prioritize delivery behavior for ad clients and its own business." (Todd Spangler, "Why Disney Built Its Own Ad Server for Disney+ and Hulu – and What the YODA Does," Variety, January 22, 2023, available at: <https://variety.com/2023/digital/news/disney-ad-server-tech-disney-plus-yoda-1235497663/>); Walmart developed its proprietary ad buying tool in collaboration with The Trade Desk, leveraging existing programmatic technology and Walmart's first-party data. See Rich Lehrfeld, "Walmart Connect Launches Its New Demand-Side Platform, Walmart DSP, To Expand Its Off-Site Media Offerings at Scale," Walmart, August 25, 2021, available at: <https://corporate.walmart.com/news/2021/08/25/walmart-connect-launches-its-new-demand-side-platform-walmart-dsp-to-expand-its-off-site-media-offerings-at-scale>. ("Walmart DSP is a first-of-its kind demand-side platform



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components of their proprietary ad tech for use by other publishers and/or advertisers.<sup>25</sup> In the jargon of economics, competition in the ad tech industry is dynamic and includes many different types of actual and potential competitors.

136) Publishers are not limited with respect to the types of inventory they can sell, as they can and do choose to change their mix of ad types in response to changes in technology and user viewing habits. For example, publishers may display their content (and hence, their ad inventory) in a variety of different digital environments (e.g., on their websites, mobile apps, and/or the websites or applications of other platforms) to best suit their business needs and to respond to the preferences of users.<sup>26</sup> Users

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that was built in partnership with the world's leading independent DSP, The Trade Desk. ... Unlike other DSP products in the market, our standalone platform combines the best-in-class technology and performance of The Trade Desk with the robust scale of Walmart's unparalleled first party omnichannel data.")). *See also* Amazon, "Ad tech solutions," available at: <https://advertising.amazon.com/adtech-solutions>. Accessed April 26, 2024 ("Our suite of ad tech solutions, including Amazon DSP and Amazon Marketing Cloud, help brands and advertisers reach their marketing goals, on Amazon and beyond."); Meta, "Move your business forward with Meta technologies," available at: <https://business.meta.com/>. Accessed April 26, 2024 ("Move your business forward with Meta technologies. Unlock your potential with marketing tools and ad solutions that take your business to the next level. Start advertising across Facebook, Messenger, Instagram, WhatsApp and more."); [REDACTED]

<sup>25</sup> For example, third-party publishers can utilize Amazon, Microsoft, Meta, [REDACTED] ad tech. (Amazon Publisher Services, "Introducing Amazon Publisher Services," available at: <https://aps.amazon.com/aps/index.html>. Accessed July 19, 2024. ("Amazon Publisher Services helps leading publishers around the world grow their business with exclusive signals, collaborative technologies, and unique demand from Amazon."); Microsoft Advertising, "Publisher Platforms," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/publisher-platforms-scaled-buying-selling-solutions>. Accessed March 18, 2024 ("Publisher Platforms: ... Xandr is uniquely positioned to offer you scaled, streamlined buying and selling platforms that are helping to shape the future of media monetization."); Meta, "Monetize My Content Refresh your revenue stream. Media and Publisher," available at: <https://www.facebook.com/business/goals/monetize-content/publishers>. Accessed July 29, 2024 ("Whether you're launching a new publication or diversifying your revenue model, Facebook monetization tools can help you earn more money."); [REDACTED]

<sup>26</sup> For example, the Dallas-Fort Worth news broadcaster NBC DFW (a.k.a., NBC 5), monetizes its content with digital display ads on text and/or video news articles through its: a) website; b) mobile apps for phones and tablets; c) Apple News channel; d) live streaming channels; e) NBCUniversal's platforms such as Peacock and Xumo; f) a variety of connected TV solutions including Roku, FireTV, and



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may view this content on any compatible device, and publishers have strong economic incentives to shift content to environments that users value. Data indicate that over the past decade, there has been substitution away from desktop computers towards mobile devices, and from banner ads to richer display types including video. For example, Exhibit 1 shows that the share of spending on web display ads (excluding social media and video ads) remained flat from 2008 to 2023, whereas the share of spending on video ads, non-video social network ads, and other digital ads (such as search, audio, email, and gaming) has expanded.<sup>27</sup> Many publishers, such as CNN, display their content (and sell ad inventory) not only on their own websites and mobile apps, but also on the websites and/or mobile apps of third-party platforms, including Apple News and Facebook.<sup>28</sup>

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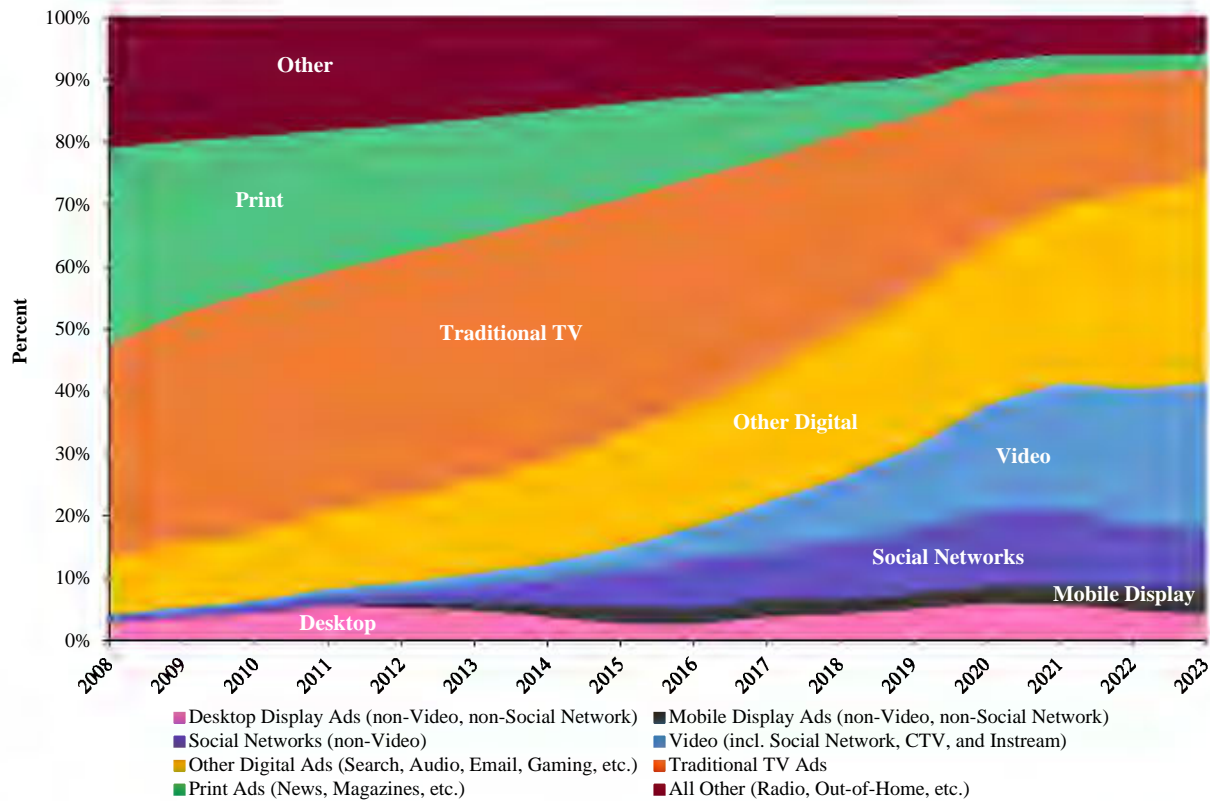
YouTube TV, as well as cross-device streaming platforms like FreeVee; and g) its over-the-air and cable TV broadcasting. (NBC DFW, “How to Watch NBC DFW Live and on Demand Anytime, Anywhere,” available at: <https://www.nbcdfw.com/about-nbc-5/how-to-watch-nbcdfw-live-and-on-demand-anytime-anywhere/3223827/>. Accessed April 19, 2024). For an example of a page from this publisher that contains display ads, *see* Scott Friedman, “Timelines for Oncor restoring power are unclear, as thousands of families wait,” NBC DFW, May 28, 2024, available at: <https://www.nbcdfw.com/investigations/oncor-power-restore-north-texas/3553031/>. Accessed July 30, 2024.

<sup>27</sup> Figure 1 shows that the volume of ad spending on video ads has grown from 2008 to 2023, whereas the spending on print ads and other ads (such as radio and Out-of-Home ads) has decreased in the same period. Google has also invested in transforming its ad tech to accommodate these industry trends. For example, a Google document from 2017 indicates that “[b]y highlighting our premium video inventory, growing deals, and shifting to mobile, we were able to grow programmatic spend on AdX Video ... by [REDACTED] YoY!” (GOOG-TEX-00348289, at -528).

<sup>28</sup> *See, e.g.*, CNN News Source, “Monetizing Digital Content: What’s Next,” available at: [https://www.cnnnewsources.com/wp-content/uploads/2016/06/Content-Monetization\\_Final\\_Chp-3.pdf](https://www.cnnnewsources.com/wp-content/uploads/2016/06/Content-Monetization_Final_Chp-3.pdf). Accessed April 16, 2024, at pp. 2 (“It’s no secret that advertising on your site alone will not deliver all the revenue you need. Here are some other options to explore as you look to flesh out your digital revenue formula.”), 4 (“[...] Google, Facebook, Apple, Twitter and more NEED publishers to distribute content into and through their ecosystems, and they’re willing to pay for the use of that content.”). In addition, the referenced website shows display ads (Kyle Feldscher, “What and how to watch Simone Biles and Team USA go for gold at the women’s gymnastics team final,” CNN, July 30, 2024, available at: <https://www.cnn.com/2024/07/30/sport/what-to-watch-simone-biles-usa-team-finals-spt/index.html>. Accessed July 30, 2024).

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**Exhibit 1**  
**Share of U.S. Ad Spending by Environment and Ad Type**  
**2008-2023**



Notes: eMarketer data do not distinguish between ads purchased directly and indirectly; all series are inclusive of all potential transaction types.

Source: DOJ RFP 57 eMarketer Data - "U.S. Ad Spending 2023."

137) Advertisers similarly have myriad options for reaching users. Advertisers negotiate direct deals with publishers, use ad buying tools, and also rely on sophisticated intermediaries such as advertising agencies to help them manage their digital advertising campaigns. Advertisers adapt their

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strategies to reach users where they can be found,<sup>29</sup> whether that be on the web, on apps, on social media, or through connected television.

**B. Ad Tech Allows Advertisers and Publishers to Buy and Sell a Variety of Types of Ads, Not Merely “Open Web Display Ads”**

138) Ad tech industry sources define display ads as “visual ads”<sup>30</sup> that contain “video, image, or text elements to market products or services”<sup>31</sup> and “captur[e] the attention of users[,] encouraging them to take action.”<sup>32</sup> They include formats such as banner ads<sup>33</sup> (including text-based banner ads),<sup>34</sup> rich

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<sup>29</sup> David Evans notes that “[a] typical advertiser will place display ads on multiple websites as well as several television shows to reach a large audience. However, as these methods are all designed to reach large numbers of people, they are probably substitutes at the margin.” (David S. Evans, “The Online Advertising Industry: Economics, evolution, and privacy,” *Journal of Economic Perspectives*, Vol. 23, No. 3, 2009, pp. 37-60, at p. 49).

<sup>30</sup> “Display advertising is defined as visual ads placed on websites, social media networks, or apps.” (Criteo, “Display Advertising, A-to-Z,” available at: <https://www.criteo.com/digital-advertising-glossary/display-advertising/>. Accessed April 26, 2024).

<sup>31</sup> Intuit Mailchimp, “Display Ads,” available at: <https://mailchimp.com/marketing-glossary/display-ads/>. Accessed April 29, 2024. *See also*, e.g., Adobe Experience Cloud Team, “Display advertising — definition, types, and benefits,” Adobe Experience Cloud Blog, June 27, 2023, available at: <https://business.adobe.com/blog/basics/display-advertising>. Accessed July 23, 2024 (“Display advertising ... are usually a combination of text and images. ... Display advertising offers banner ads, pop-ups, pop-unders, wallpaper ads, interstitial ads, map ads, video ads, and more.”).

<sup>32</sup> Adobe Experience Cloud Team, “Display advertising — definition, types, and benefits,” Adobe Experience Cloud Blog, June 27, 2023, available at: <https://business.adobe.com/blog/basics/display-advertising>. Accessed July 23, 2024.

<sup>33</sup> “A banner ad is a type of display ad (visual online advertisement) that’s placed in a prominent webpage location with the aim of drawing users’ attention.” [They] “are designed to send traffic to landing pages or other important webpages (like product pages) [a]nd generate conversions (desirable actions).” (Rachel Handley, “Banner Ads: What They Are & How to Create Them,” Semrush Blog, November 15, 2023, available at: <https://www.semrush.com/blog/banner-ads/>).

<sup>34</sup> Google ad tech allows for the placement of “text ad[s] typically includ[ing] a title that’s also a clickable link to a webpage, one or two lines of text, and a website address” as banner ads on publisher websites. (Google Ad Manager Help, “Example Text Ads,” available at: <https://support.google.com/admanager/answer/6258694>. Accessed June 11, 2023). These ads, as a subset of banner ads, are considered display ads in my analyses, and Google has clarified that in data it has produced in this matter “display ads include the ... ‘Text’” creative ad format. (GOOG-AT-MDL-C-000017381 at -398).

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media ads,<sup>35</sup> video ads,<sup>36</sup> interstitial ads,<sup>37</sup> and native ads.<sup>38</sup> Publishers are free to choose the types of ad creatives that advertisers can display on their content.<sup>39</sup> They may be transacted directly or indirectly<sup>40</sup> and appear “across websites, social media, and apps”<sup>41</sup> as well as on connected TVs or related devices.<sup>42</sup> When I refer to “display ads” in the discussions and analyses that follow, unless otherwise stated, I include these types of ads that are commonly defined as display ads by industry participants<sup>43</sup> and as

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<sup>35</sup> “[R]ich media [ads] ... involve[] using interactive elements such as video, audio, and clickable elements to make the advertisement more engaging.” (Chiradeep BasuMallick, “What Is Display Advertising? Definition, Targeting Process, Management, Network, Types, and Examples,” SpiceWorks, March 16, 2021, available at: <https://www.spiceworks.com/marketing/programmatic-advertising/articles/what-is-display-advertising/>).

<sup>36</sup> Video ads are a type of rich media ad “that play within a banner or expand to a larger size. These include in-stream video ads on platforms like YouTube, incorporating interactive elements.” (Deepak Sharma, “What Are Rich Media Ads? How publishers can use them to uplift ad revenue,” AdPushUp, April 25, 2024, available at: <https://www.adpushup.com/blog/rich-media-ads/>).

<sup>37</sup> “These are ads that appear as a separate webpage before you are directed to the original page that you wanted to visit on the internet. They are effective in capturing the user’s attention as they take up the entire screen.” (Chiradeep BasuMallick, “What Is Display Advertising? Definition, Targeting Process, Management, Network, Types, and Examples,” SpiceWorks, March 16, 2021, available at: <https://www.spiceworks.com/marketing/programmatic-advertising/articles/what-is-display-advertising/>).

<sup>38</sup> One industry publication of display ads lists native ads as a “common display ad type[.]” Further, “it’s important to note that native ads with visual elements actually fall under the category of display advertising.” (Asif Ali, “Display Ads: What They Are, Types, & How They Work,” Semrush Blog, October 26, 2023, available at: <https://www.semrush.com/blog/display-ads/#types-and-formats-of-display-ads>).

<sup>39</sup> Appendix V describes the types of ads available, by environment, to buy and sell third-party content using Google ad tech. For example, Google Ads lists Video Ads, Image Ads, App Promotion Ads, and Text Ads as possible ad types that can be displayed on desktop websites.

<sup>40</sup> “One of the most common questions that marketers face in buying display advertising is whether to contact a publisher or ad network directly to purchase inventory (called a Direct Buy), or through indirect channels using real-time bidding (RTB) systems.” (Ratko Vidakovic, “Display Ads: How Direct Buys & RTB Interact,” MarTech, March 4, 2013, available at: <https://martech.org/display-ads-how-direct-buys-and-rtb-interact/>).

<sup>41</sup> Alexis Herrington, “How To Get The Most Out Of Your SaaS Display Ads,” ScaleCrush Blog, January 23, 2024, available at: <https://scalecrush.io/blog/saas-display-ads>.

<sup>42</sup> “Display ads” are marketed as a format to advertisers looking to reach internet users through Connected TV ads. (Sprinkles Media, “Connected TV: A Guide To The Future Of Advertising,” available at: <https://www.sprinklesmedia.com/confectionary/connected-tv-a-guide-to-the-future-of-advertising>. Accessed July 24, 2024).

<sup>43</sup> See, e.g., Evelyn Mitchell-Wolf, “Display ad spending’s potential disruptors: What’s worth the buzz?” eMarketer, May 25, 2022, available at: <https://www.emarketer.com/content/display-ad-spending-potential-disruptors>. (“Digital display is a huge advertising category encompassing static images, rich media (e.g., interactive banners, video, digital audio), sponsorships, and native placements like promoted content and in-feed units on social networks and news sites.”). This definition is also consistent with public statements by ad tech businesses: “Display ads can help you promote your business when people are browsing online, watching YouTube videos, checking Gmail, or using mobile devices and apps.” (Google Ads, “Reach the right audience with Display Ads,” available at: [https://ads.google.com/intl/en\\_us/home/campaigns/display-ads/](https://ads.google.com/intl/en_us/home/campaigns/display-ads/). Accessed April 29, 2024.); “Display advertising is defined as visual ads placed on websites, social media networks, or apps. They are typically image, text, or video banner ads that when clicked on, take a user to a website or landing page.” (Criteo, “Display Advertising, A-to-Z,” available at: <https://www.criteo.com/digital-advertising->

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used by eMarketer.<sup>44</sup> Other categories of digital ads such as search,<sup>45</sup> audio,<sup>46</sup> and digital out-of-home<sup>47</sup> are generally excluded from these industry definitions of display ads, and consequently, from my analyses of display ads.

139) Professor Gans, however, focuses his report on a narrow subset of display ads he describes as “open web display.”<sup>48</sup> He excludes from his analysis several categories of display advertising,

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glossary/display-advertising/. Accessed April 26, 2024.); “Display advertising refers to ads that are delivered online—via social media, stores like Amazon, or apps. These ads can feature text, images, animations, video, and/or audio.” (Amazon Ads, “Best display ad examples,” available at: <https://advertising.amazon.com/library/guides/display-ads-examples>. Accessed April 29, 2024.); “Display ads are images, videos, or gifs shown to users on websites or apps.” (Mailchimp, “Display Ads,” available at: <https://mailchimp.com/marketing-glossary/display-ads/>. Accessed April 29, 2024).

Even in 2012, the main page of Google Ads’ “Display Network” website described display ads as “Text Ads on websites,” “Image Ads on websites,” “Video Ads on websites,” and “Ads on Mobile Websites.” (Google Ads, “Display Network,” available at: <https://web.archive.org/web/20120701032721/http://www.google.com/ads/displaynetwork/>. Accessed July 29, 2024).

<sup>44</sup> Notes in eMarketer data indicate that display ad spending “includes advertising that appears on desktop and laptop computers as well as mobile phones, tablets, and other internet-connected devices for all formats mentioned; includes banners, rich media, sponsorships, video, and ads such as Facebook’s News Feed Ads and Twitter’s Promoted Tweets.” (GOOG-AT-DOJ-DATA-000066787, at ‘US Ad Spend Metrics’ tab, cell Y67).

<sup>45</sup> “Search ads vs Display ads[:] both serve different purposes in advertising. Search ads target users actively searching for products/services, with high intent & conversion rates.” (Ngoc Nguyen, “Search Ads vs Display Ads: Differences and Which to Choose,” Meta Digital, June 16, 2023, available at: <https://megadigital.ai/en/blog/search-ads-vs-display-ads/>. Accessed July 25, 2024).

<sup>46</sup> Industry sources recognize the distinction between display and audio ads; “Audio ads generate greater brand recall than display and online video ads.” (Megan Reschke, “Digital Audio Advertising in 2024,” Basis Technologies, February 15, 2024, available at: <https://basis.com/blog/digital-audio-advertising-in-2024>).

<sup>47</sup> “Digital out-of-home (DOOH) advertising ... offers some of the advantages of the technology used in online display advertising, such as targeting and enhanced traffic data, but at the same time it is completely immune to ad blockers, and OOH ads cannot be skipped by the user.” (Michal Wlosik, “What Is Digital Out-of-Home (DOOH) Advertising and How Does It Work?,” Clearcode, May 15, 2024, available at: <https://clearcode.cc/blog/what-is-digital-out-of-home-doo/>).

<sup>48</sup> See, e.g., Gans Report, at ¶¶79 (“Open web display ads are a distinct type of online advertising appearing on content providers’ or publishers’ websites to reach a target user or audience.”), 120 (“I find there are four relevant product markets: (1) the market for publisher ad servers used for open web display advertising inventory, (2) the market for ad exchanges for transacting indirect open web display advertising, (3) the market for ad buying tools for small advertisers for buying open web display advertising space, and the market for ad buying tools for large advertisers for buying open web display advertising space.”). Additionally, Professor Gans focuses his analyses on what the Complaint refers to as “indirect sales of web display ad[s].” (Fourth Amended Complaint, at ¶¶47, 92).

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including direct deals,<sup>49</sup> video ads,<sup>50</sup> ads on “walled gardens,”<sup>51</sup> mobile apps,<sup>52</sup> social media sites,<sup>53</sup> and connected TVs.<sup>54</sup> Henceforth, I will use phrases such as “Professor Gans’ candidate markets,” “narrow framework,” or “display ads (narrow)” to refer to this artificially limited definition of display ads.<sup>55</sup> My

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<sup>49</sup> See Gans Report, at ¶¶200 (“programmatic direct transactions are not a reasonable substitute for indirect, open web transactions.”), 211 (“[p]rogrammatic direct deals are not strong substitutes for programmatic indirect deals despite both transaction types being enabled through exchanges.”), 350 (referring to “direct deals” as “transactions excluded from my market definition”). In describing the market for ad exchanges, Plaintiffs state that “[a]d exchanges for web display ads are real-time auction marketplaces that match multiple buyers and multiple sellers on an impression-by-impression basis[,]” and that “Google itself recognizes internally, exchanges are not interchangeable with the direct sales channel.” (Fourth Amended Complaint, at ¶¶58, 133). In describing markets for ad buying tools, Plaintiffs state that “ad buying tools ... optimize and effectuate the[] purchases of ad impressions through an exchange or on a network. . . .On an advertiser’s behalf, an ad buying tool uses ... parameters to automatically bid on impressions in exchanges and/or networks.” (Fourth Amended Complaint, at ¶¶71-72). When making this exclusion, I also exclude related non-auction-based transactions where buyers and sellers negotiate terms directly, like preferred deals and programmatic guaranteed deals.

<sup>50</sup> See Gans Report, at ¶¶57, fn. 18 (“In this context, video ads referred to are ‘outstream’ video ads. ‘Instream’ video ads are part of the relevant market.”), 77 (“[I]t can be inferred that there is relatively low substitutability between display ads and video ads.”). Plaintiffs are explicit that they do not consider instream video ads to be display ads: “[I]n-stream’ video ads—commercials shown in frame before or after video content is displayed—are yet another category of [non-display] online advertising, one that enjoys premium prices for its unrivaled ability to command a user’s attention.” (Fourth Amended Complaint, at ¶39). “Other forms of online advertising (e.g., in-stream video, social media, search, and in-app) are not substitutes for web display advertising.” (Fourth Amended Complaint, at ¶135). However, data produced in this matter do not consistently allow for differentiation between instream and outstream video ads. To be conservative, I exclude all video ads from this narrow subset of display ads.

<sup>51</sup> See Gans Report, at ¶223. (“Amazon, Meta, and other WGP’s [Walled Garden Publishers] [...] do not perform the key functionality of an ad exchange for transacting indirect open web display advertising (the matching of buy- and sell-side) and are thus not to be included in the market for ad exchanges for transacting indirect open web display advertising.”). Plaintiffs contrast a “‘walled garden’—a closed ecosystem—[to] the otherwise-open internet.” (Fourth Amended Complaint, at ¶28). Plaintiffs include only “advertisements to users across the open web (i.e., on websites whose inventory is available via an exchange or network)” in their narrow definition of the candidate markets. (Fourth Amended Complaint, at ¶165).

<sup>52</sup> See Gans Report, at ¶¶197 (“Ad networks, in-app networks, and publisher ad servers offer distinct characteristics, uses, and customers and operate differently than open web display ad exchanges. Thus, these products are not reasonable substitutes for open web display ad exchanges.”), 218 (“there is limited substitution between in-app networks and ad exchanges for transacting indirect open web display advertising”), 350 (referring to “in-app ads” as “transactions excluded from my market definition”). “[D]istinctions exist between ads for display on the open web and ads for display within a smartphone application. While many online media companies offer both a website and an ‘app,’ the displays [sic] ads shown on each platform are characterized by different features, levels of user engagement, and prices paid by advertisers. Open web and in-app ads are therefore generally not interchangeable.” (Fourth Amended Complaint, at ¶41).

<sup>53</sup> See Gans Report, at ¶241. (“Ad tech tools for buying non-display advertising, like social media, search advertising, in-stream video advertising, and in-app advertising are not reasonable substitutes for ad-buying tools for advertisers for buying open web display advertising because the ad formats perform different roles for advertisers and enable advertisers to gather distinct user information.”). “A recent natural experiment further demonstrates the non-interchangeability of social media advertising with open web display advertising. ... This unique natural experiment clearly demonstrates that advertisers do not consider these two types of advertising (and likewise, the separate buying tools) to be interchangeable.” (Fourth Amended Complaint, at ¶175).

<sup>54</sup> See Gans Report, at ¶136. (referring to “Connected TV” as inventory “excluded from [the] relevant market [for publisher ad servers]” because “[t]hese other types of inventories are not substitutes for publishers that sell open web display ad inventories.”)

<sup>55</sup> I note that Professor Gans’ definitions of these groups are vague and lack detail to identify, specifically, the websites to which his definitions apply. For example, Professor Gans’ assertion that “[s]ocial media advertising involves running paid advertisements on social



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independent data analyses and review of the record are consistent with Professor Ghose's opinion that digital display includes the following formats: text, image, video (instream and outstream), and non-video rich media ads.<sup>56</sup> They are also consistent with Professor Ghose's opinion that advertisers buy display ads across various environments, including websites (desktop and mobile), mobile apps, social media platforms, retailer platforms, and streaming services.<sup>57</sup> Further, they are consistent with how industry participants define display advertising.<sup>58</sup>

140) Professor Gans' focus on open web display ads, to the exclusion of the other ads transacted by the same tools, is artificial and unlikely to reflect competition in the real world. In the real world, ad tech customers, providers, and industry publications tend to refer to display ads in a more general sense,<sup>59</sup>

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media platforms ... and can be targeted to a subset of users based on demographics, user behavior and the behavior/preferences of other users with similar characteristics" (Gans Report, at ¶85) can apply to many businesses that run ads on their websites that he has not attempted to identify or exclude from his market. For example, the website Goodreads meets Professor Gans' criteria for a social media platform and also earns revenue from display ads. (Goodreads, "How do groups work?" May 5, 2021, available at: <https://help.goodreads.com/s/article/How-do-groups-work-1553870935331>. ("Goodreads Groups can be used to connect with other Goodreads members who have similar interests and would like to engage in discussion about books and other topics. You can participate in groups by adding books to the group shelves or inviting other members to join.")). Professor Gans has made no attempt to distinguish social media platforms selling display ads from other websites.

<sup>56</sup> Ghose Report, at ¶40.

<sup>57</sup> Ghose Report, at ¶45.

<sup>58</sup>



<sup>59</sup> See the following examples from online publications: "Display ads can help you promote your business when people are browsing online, watching YouTube videos, checking Gmail, or using mobile devices and apps." (Google Ads, "Reach the right audience with Display Ads," available at: [https://ads.google.com/intl/en\\_us/home/campaigns/display-ads/](https://ads.google.com/intl/en_us/home/campaigns/display-ads/). Accessed April 29, 2024.); "Display

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advertising is defined as visual ads placed on websites, social media networks, or apps. They are typically image, text, or video banner ads that when clicked on, take a user to a website or landing page.” (Criteo, “Display Advertising, A-to-Z,” available at: <https://www.criteo.com/digital-advertising-glossary/display-advertising/>. Accessed April 26, 2024); “Display advertising refers to ads that are delivered online—via social media, stores like Amazon, or apps. These ads can feature text, images, animations, video, and/or audio.” (Amazon Ads, “Best display ad examples,” available at: <https://advertising.amazon.com/library/guides/display-ads-examples>. Accessed April 29, 2024); “Digital display is a huge advertising category encompassing static images, rich media (e.g., interactive banners, video, digital audio), sponsorships, and native placements like promoted content and in-feed units on social networks and news sites.” (Evelyn Mitchell-Wolf, “Display ad spending’s potential disruptors: What’s worth the buzz?” eMarketer, May 25, 2022, available at: <https://www.emarketer.com/content/display-ad-spending-potential-disruptors>.); “Display ads are images, videos, or gifs shown to users on websites or apps.” (Mailchimp, “Display Ads,” available at: <https://mailchimp.com/marketing-glossary/display-ads/>. Accessed April 29, 2024).



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and include advertising types excluded from Professor Gans' candidate markets, including direct deals,<sup>60</sup> video ads,<sup>61</sup> ads on "walled gardens,"<sup>62</sup> mobile apps,<sup>63</sup> social media,<sup>64</sup> and connected TV.<sup>65</sup> Likewise,

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<sup>60</sup> *See, e.g.,* [REDACTED]

<sup>61</sup> *See, e.g.,* [REDACTED]

<sup>62</sup> *See, e.g.,* [REDACTED]

<sup>63</sup> *See, e.g.,* [REDACTED]

<sup>64</sup> *See, e.g.,* [REDACTED]

<sup>65</sup> *See, e.g.,* [REDACTED]

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the ad tech offerings at issue provide the ability to transact a wider variety of ad types—many of which Professor Gans excludes from his candidate markets—as standard features of their offerings. Professor Gans’ approach to exclude various types of ads (e.g., video ads and in-app ads) from the definition of display advertising is at odds with commercial realities and does not align with eMarketer’s definition.<sup>66</sup>

141) As discussed in Appendix I, the very same tool that allows an advertiser or publisher to buy or sell a narrow display ad also allows that customer to buy or sell other types of display ads that Professor Gans excludes, including video and mobile in-app ads. In addition to Google, The Trade Desk, Amazon Ads, Criteo, and many other companies offer buying tools that permit advertisers to purchase a variety of types of digital ads. In addition to Google, Magnite, Microsoft’s Xandr, PubMatic, Index Exchange, many other companies facilitate transactions between advertisers and publishers for a variety of types of digital ads. In addition to Google,<sup>67</sup> Microsoft, Kevel, Equativ, and many other companies offer publisher ad servers that manage publishers’ inventory across a variety of types of digital ads. Appendix I further demonstrates that Professor Gans’ focus on ad tech tools for his narrow definition of display ads on the open web is inconsistent with commercial realities. In the real world, the ad tech of Google and its competitors is not limited to the purchase and sale of “open web display” ads, but also

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<sup>67</sup> AdX and DFP were integrated into a single product that was rebranded as Google Ad Manager in 2018. (Sarah Sluis, “DoubleClick No More! Google Renames Its Ad Stack,” Ad Exchanger, June 27, 2018, available at: <https://www.adexchanger.com/platforms/doubleclick-no-more-google-renames-its-ad-stack/>. (“Changes to the publisher product, Google Ad Manager, mostly reflect changes that have already been made to unify the ad server formerly known as DFP and the exchange formerly known as AdX.”)).

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facilitates the purchase and sale of many other types of digital ads, including in-app advertising, video advertising, connected television advertising, and social media advertising.

### C. The Pricing of Ad Tech Services

142) Ad tech companies do not set the prices that advertisers pay for Professor Gans' narrow definition of display ad impressions; these prices are determined in auctions.<sup>68</sup> The pricing data on impressions in the record pertain to impressions purchased through auctions. The prices that winners pay at auction typically vary for reasons that may include variation in: bidder (advertiser) preferences for the inventory of different publishers,<sup>69</sup> publishers' preferences over different advertisers,<sup>70</sup> the number of advertisers and publishers competing to buy and sell ad inventory,<sup>71</sup> type of auction<sup>72</sup> and other auction

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<sup>68</sup> Professor Gans' narrow definition of display ads excludes direct deals, which are negotiated directly between advertisers and publishers. Ad tech companies also do not set prices for and generally do not know the amounts advertisers pay publishers for (non-programmatic) direct deals. Several ad tech companies offer means of transacting "programmatic guaranteed" and other types of deals involving negotiated prices. The pricing terms of these deals are known to the ad tech companies that facilitate them. (See, e.g., Google Ad Manager Help, "Programmatic Guaranteed vs. Preferred Deals," available at: <https://support.google.com/admanager/answer/7637485>. Accessed July 29, 2024; Microsoft, "Create a programmatic guaranteed deal," available at: <https://learn.microsoft.com/en-us/xandr/monetize/create-a-programmatic-guaranteed-selling-line-item>. Accessed July 29, 2024; Adobe, "Set up a Programmatic Guaranteed Deal," available at: <https://experienceleague.adobe.com/en/docs/advertising/dsp/inventory/private-inventory/deal-ids/programmatic-guaranteed-deal/programmatic-guaranteed-set-up>. Accessed July 29, 2024).

<sup>69</sup> This is related to the distribution of values assumption in various models of auctions. See, e.g., Vijay Krishna, *Auction Theory*, Edition 2, Academic Press, 2010, at pp. 3-4.

<sup>70</sup> Google offers publishers a variety of ways to implement their preferences over the types of ads that can compete for their ad space. See, e.g., Google Ad Manager Help, "Protections overview," available at: <https://support.google.com/admanager/answer/2913553>. Accessed July 29, 2024 (Google offers the following example for publishers: "You decide to opt in to alcohol ads. Then, you decide to block all buyers except Advertiser A, Advertiser B, and Advertiser C. Regardless of your opt-in, the only traffic you will receive is from Advertiser A, Advertiser B, and Advertiser C. All other traffic will be blocked."). As another example, publishers can review the ads that have been shown to users on their site and impose forward-looking restrictions on which advertisers can compete for their ad space. See, e.g., Google Ad Manager Help, "Ad review center overview," available at: <https://support.google.com/admanager/answer/146769>. Accessed July 29, 2024 ("With the Ad review center, you can review individual ads after they're shown and choose whether you want to continue showing them on your pages.").

<sup>71</sup> "Increasing the number of bidders increases the revenue on average of the seller." (R.Preston McAfee and John McMillan, "Auctions and Bidding," *Journal of Economics Literature*, Vol. 25, No. 2, 1987, pp. 699-738, at p. 711).

<sup>72</sup> For instance, in a second-price auction, the highest bidder wins but pays the price of the second-highest bidder. In a first-price auction, the highest bidder wins and pays its own bid. While second-price auctions incentivize truthful bidding and first-price auctions incentivize bid shading, in some economic environments these and other auctions result in identical expected payments (See, e.g., Theorem 0 and the discussion following it in, Paul R. Milgrom and Robert J. Weber, "A theory of auctions and competitive bidding,"

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rules,<sup>73</sup> strategies employed by different advertisers and publishers,<sup>74</sup> quality of impressions,<sup>75</sup> and potentially other factors I consider throughout my report.<sup>76</sup>

143) The fees publishers and advertisers pay for ad tech services depend on the number and value of impressions or clicks processed.<sup>77</sup> For example, Google charges advertisers using its DV360 buying tool a fee that is a percentage (about [REDACTED]) of the value of the ad impressions purchased (called “ad

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*Econometrica*, Vol. 50, No. 5, 1982, pp. 1089-1122, at p. 1093). In other economic environments, the expected payment may be higher in a second-price auction (See, e.g., Theorem 15 in Paul R. Milgrom and Robert J. Weber, “A theory of auctions and competitive bidding,” *Econometrica*, Vol. 50, No. 5, pp. 1089-1122, at p. 1109).

<sup>73</sup> Establishing such rules may prevent dissipative opportunism. For example, suppose an auctioneer makes significant investments to bring potential buyers and sellers of art together. Because of these investments, there is a thick market; for each painting up for sale, there are numerous potential buyers. The owner of a painting does not know how valuable the painting is, and is attracted to the auction because there are many serious buyers. Thus, the auction is valuable to a seller because the seller does not know the value of the painting. An auctioneer may impose restrictions requiring sellers to commit to sell their items to the highest bidder, and for bidders to commit to pay the price they bid. Otherwise, bidders have little incentive to submit serious bids. Establishing these rules prevents dissipative opportunism. Without such rules, an opportunistic seller could bring an item for sale, take advantage of the thick market the auctioneer created to see what the item is worth, and then withhold the item and sell it through an alternative means. While this might be beneficial to the individual opportunistic seller (e.g., avoiding paying the auctioneer’s commission or possibly fetching a higher price through negotiations that exploit this information), this reduces the value to buyers of showing up in the first place and to the auctioneer of creating a robust marketplace. Of course, other sellers would have similar incentives, thus diminishing buyers’ incentives to participate in the auction. This could start a vicious cycle, as seller incentives to participate would diminish because fewer bidders at the auction translates into lower price through the auction (and lower commissions for the auctioneer, reducing their welfare in turn). The thinner market stemming from fewer buyers and sellers at the auction reduces the auctioneer’s incentive to make the investments that allowed it to match paintings to the people valuing them the most in the first place.

<sup>74</sup> Publishers’ use of reserve prices (also called floor prices) is one example. A reserve price is a commitment by a seller to not sell an item unless the price is above the reserve price. It is well-known that a reserve price may raise “... the revenue to the seller but may have a detrimental effect on efficiency.” Vijay Krishna, *Auction Theory*, Edition 2, Academic Press, 2010, at p. 24.

<sup>75</sup> As discussed in more detail below, the investments, technologies and features of some ad tech providers may result in higher quality matches than others.

<sup>76</sup> I have not been asked to evaluate the impact of specific auction rules on efficiency or the welfare of specific advertisers or publishers. Instead, I have been asked to examine whether the conduct at issue harmed competition.

<sup>77</sup> In addition, some ad tech businesses implement minimum spend requirements for buying tools and fixed fee components of ad server pricing. For example, Google DV360, The Trade Desk, Microsoft’s Xandr Invest, Yahoo, and others utilize a minimum monthly ad-spend requirement. See Karoliina Ranne, “17 Best Programmatic Advertising Platforms to Choose From,” Nexd, March 20, 2023, available at: <https://www.nexd.com/blog/17-best-programmatic-buying-platforms-to-choose-from/>. Accessed May 24, 2024. (“... some big DSPs like Google’s DV360, The Trade Desk, Xandr and Yahoo have a minimum monthly ad-spend limit, anywhere from \$50,000-\$100,000, to access the platform. Hence, many brands must go through performance marketing agencies to access a programmatic buying platform. Some others are more flexible and do not set a minimum ad spend limit, or it is lower, such as Adform and Mediasmart or Beeswax, which has a minimum monthly spend of \$10,000 per month.”). AdButler provides a range of starting monthly fees that customers can then configure for their specific use cases. See, AdButler, “Pricing,” available at: <https://www.adbutler.com/pricing.html>. Accessed June 30, 2024. (providing plan options “Essential,” “Standard,” “Advanced,” and “Enterprise” which have differing sets of features).

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spend”).<sup>78</sup> The platform fees that DV360 charges to advertisers who buy impressions through its buying tool likewise have been declining over time and were at [REDACTED], measured relative to the value of the ad impressions purchased, in 2023.<sup>79</sup> Google charges publishers using its ad exchange (formerly called AdX and now part of Google Ad Manager, or “GAM”) for narrow display ad transactions a “revenue share” that on average is about [REDACTED] of the value of ad impressions sold through open auction.<sup>80</sup> Google does not charge the vast majority of publishers any fees for serving ads with its Google Ad Manager ad server (formerly called “DoubleClick for Publishers” or “DFP” and now also part of GAM);<sup>81</sup> across all customers, the average price paid for using Google’s ad server in 2022 was about [REDACTED].<sup>82</sup> Exhibit 2 and Exhibit 3 demonstrate that the fees that Google charges customers using DV360 and AdX have generally remained stable or declined over the time period for which data are available. Exhibit 4 shows that this is also the case for ad serving fees on

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<sup>78</sup> This is the average percentage fee indicated on DV360 rate sheets for U.S. advertisers. (GOOG-DOJ-AT-00031508, at ‘DV360 Detail’ tab, cells B13:I16).

<sup>79</sup> See Exhibit 2.

<sup>80</sup> In Section IX.B.2, I show that AdX revenue share in the candidate market for ad exchanges excluding Open Bidding has been near 20 percent from 2014 to 2023.

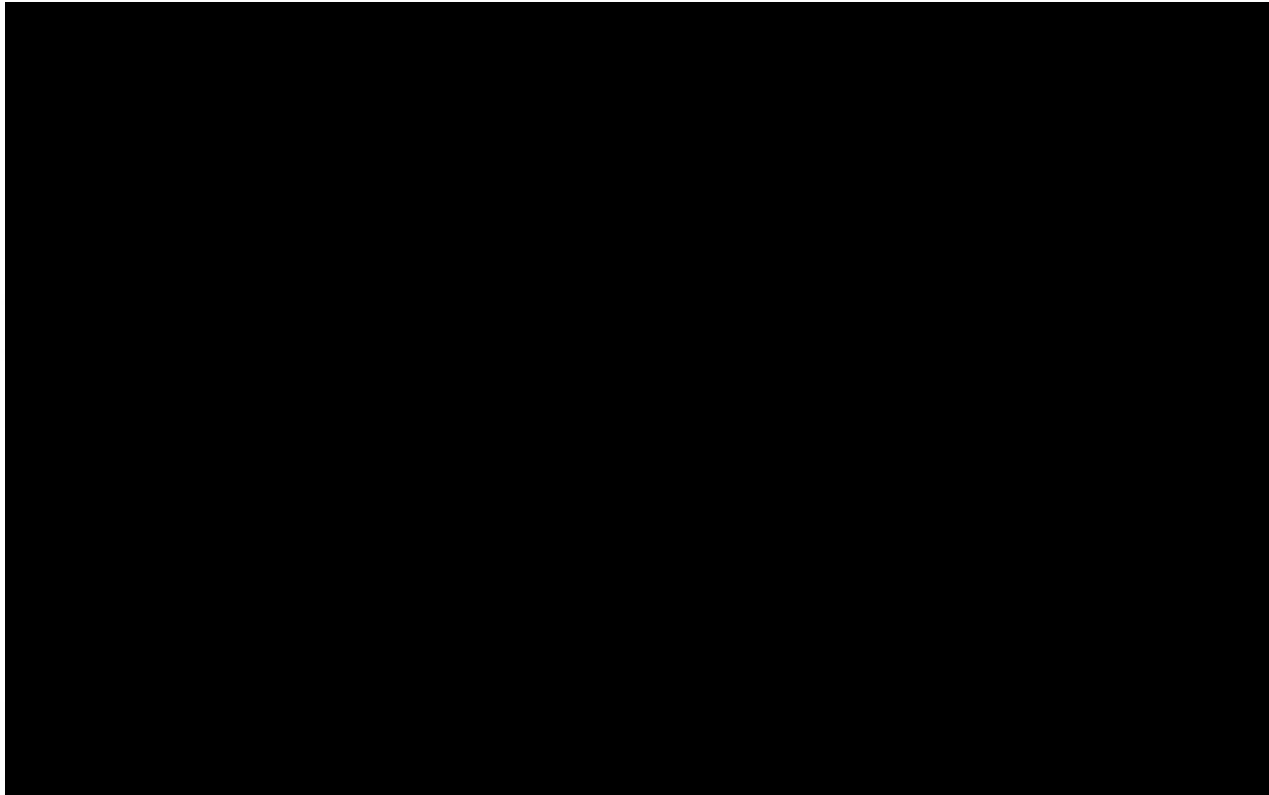
<sup>81</sup> For convenience, I will refer to Google’s ad exchange as AdX and Google’s ad server as DFP.

<sup>82</sup> This price refers to the average fee charged in Google DFP data to all publishers. Google typically does not charge publishers an ad serving fee on impressions that are monetized through a Google exchange or network. Given that the standard AdX revenue share is [REDACTED], this implies no ad serving fees for impressions going through a Google exchange or network. (Google Ad Manager, “How our display buying platforms share revenue with publishers,” available at: <https://blog.google/products/admanager/display-buying-share-revenue-publishers/>. Accessed July 30, 2024; GOOG-DOJ-03619484, at -484). Publishers that serve less than 90 million standard impressions per month on a Small Business account may pay nothing. Publishers that serve impressions from Google Ad Manager 360 (i.e., its premium tier) pay based on a different pricing structure that does not include a standard free impression limit. (GOOG-DOJ-AT-00031508, at “Sell-side Rate Card” tab).

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DFP.<sup>83</sup> Specifically, Google's ad serving fees have decreased by roughly one third from around [REDACTED] per thousand impressions in 2014 to [REDACTED] per thousand impressions in 2022.

**Exhibit 2**



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<sup>83</sup> Owing to the GAM ad serving fee structure, improvements in the quality of Google's ad tech stack and other factors that may influence the number and type of impressions served, one must use caution in interpreting these data. For example, if demand or improvements in quality result in publishers serving more ads, this will tend to increase the number of publishers above the 90 million monthly impression threshold that triggers positive fees on the small business version of the ad server. I also note that Google waived GAM ad serving fees during the COVID pandemic, and then reinstituted them. (Sarah Sluis, "Google Ad Manager Will Waive Ad Serving Fees For News Publishers," AdExchanger, April 17, 2020, available at: <https://www.adexchanger.com/publishers/google-ad-manager-will-waive-ad-serving-fees-for-news-publishers/>). Regardless, documents are consistent with publishers paying lower ad server fees. For instance, a Google presentation dated July 9, 2018 states: "Avg. serving fees declined [REDACTED] in the last 2 years due to volume based discounts, increase volume from SB pubs (free ad serving) and increased platform fee waivers [REDACTED]." (GOOG-TEX-00124787, at -797).

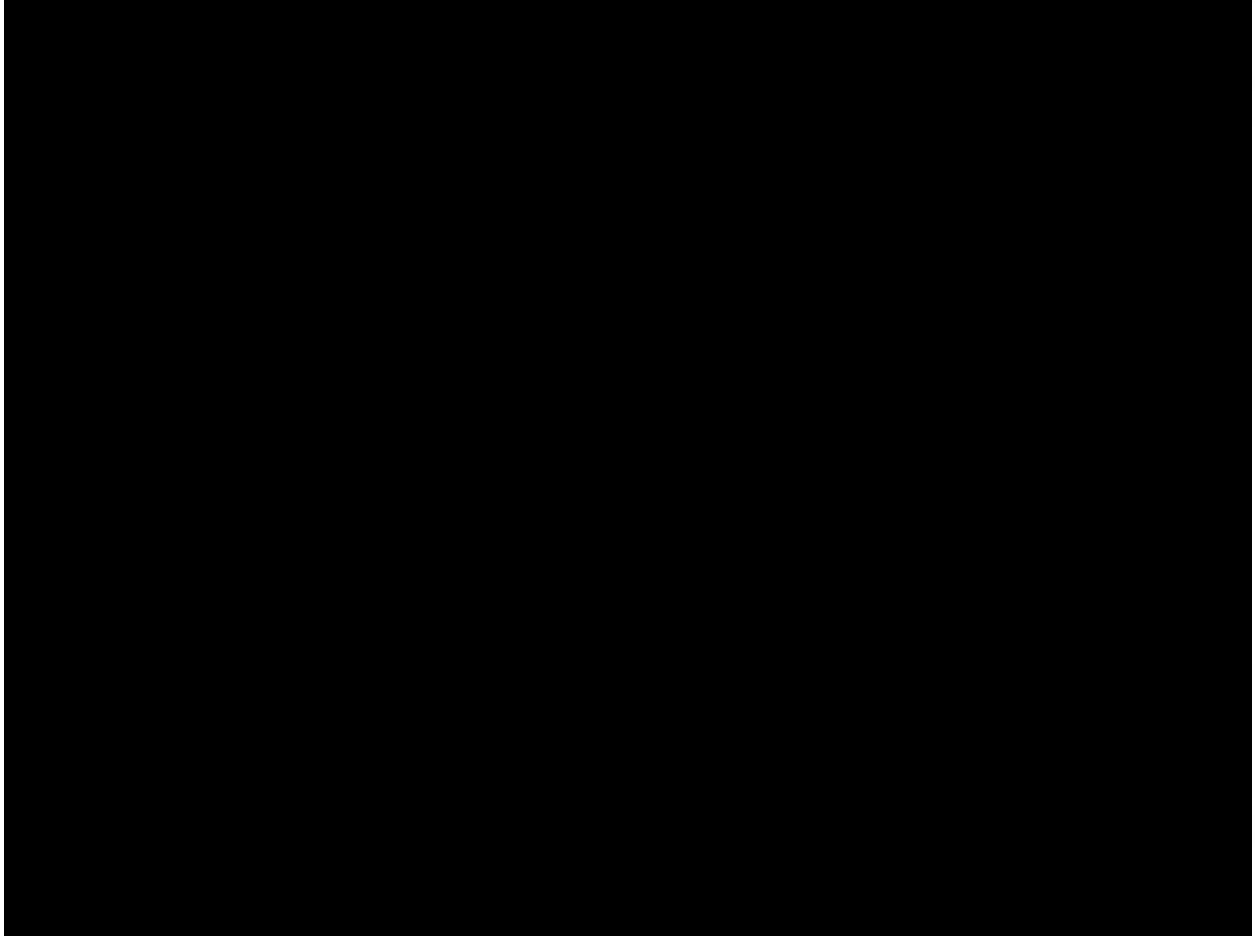
I also note that if quality increases, increases in nominal fees do not imply that quality-adjusted fees increased. This is important because documents indicate that the "value offered to pub[lisher]s have increased ... through yield optimizations (like OC), Insights (Opportunities, AIH), forecasting (seasonality), budget and pacing improvements, unified QT reporting, [and] troubleshooting, etc." (GOOG-TEX-00124787, at -797). An example of increased quality is further integration with Google Ads, which included access to new metrics in the Publisher Report and creating Google Analytics Audiences for DFP. "The reason this [GA-DFP integration] is really awesome is because it's not just great to have more metrics in GA, it's because when you analyze your page lift, or create Audiences for DFP, Analytics 360 will pay for itself, and you'll make more money." (Chris Bridges, "Improved ROI with DFP & GA360," Adswerve, November 17, 2016, available at: <https://adswerve.com/blog/improved-roi-ga-dfp>).

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Notes: The Google DV360 Fees are calculated as gross revenue for platform fees divided by the sum of gross revenue for media costs and platform fees. Values may be slightly understated due to third-party verifier fees. Data are limited by U.S. DV360 advertiser geography and are not limited to display ads.

Source: MDL DV360 XBridge Data.

**Exhibit 3**

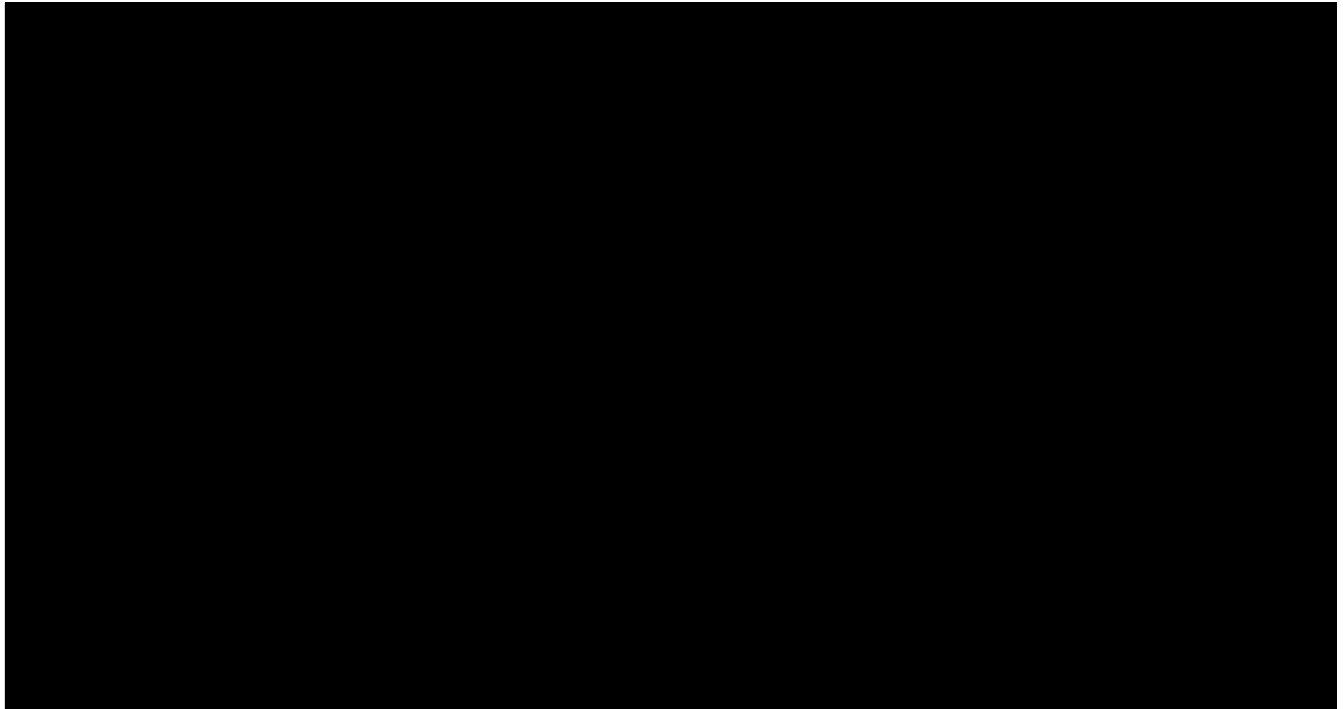


Notes: Includes Open Auction, Private Auction, Preferred Deals, and Programmatic Guaranteed Transactions. Before July 8, 2014, Google did not record gross revenue data. *See* GOOG-AT-MDL-008932468, at -471.

Source: MDL RFP 243 AdX Data.

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**Exhibit 4**



Notes: Total impressions represent the sum of invoiced and uninvoiced impressions for publishers. Total fees per thousand total impressions have been calculated as total fees divided by total impressions multiplied by 1,000. Data are not limited to narrow display ads. Data do not allow disaggregation of fees charged for mobile ads from narrow display ads. The trough observed in 2020 is due to GAM waiving certain fees during the COVID-19 pandemic. (Sarah Sluis, “Google Ad Manager Will Waive Ad Serving Fees For News Publishers,” Ad Exchanger, April 17, 2020, available at: <https://www.adexchanger.com/publishers/google-ad-manager-will-waive-ad-serving-fees-for-news-publishers/>).

Source: DOJ RFP 57 DFP Fees Data.

144) Google describes the pricing of its Google Ads buying tool as follows: “With Smart campaigns, you pay only for the actual clicks and calls that your ad receives.”<sup>84</sup> As shown in Exhibit 5, the average prices advertisers using Google Ads pay for clicks generally have declined (following an initial price increase) since Google launched AdX 2.0 in 2009.<sup>85</sup> By providing advertisers the option of

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<sup>84</sup> Google Ads Help, “Understanding costs and payments,” available at: <https://support.google.com/google-ads/answer/9846714>. Accessed August 6, 2024.

<sup>85</sup> I use these data because they are the only data available before the integration of AdX and Google Ads through the launch of AdX 2.0. “In 2009, Google relaunched DoubleClick’s exchange as AdX 2.0. As part of this revamp, Google made its ad-buying tool for small advertisers (AdWords) exclusive to its exchange, AdX.” (Gans Report, at ¶420). These data do not allow one to disentangle AdX CPCs from AdSense CPCs after the launch of AdX 2.0 nor does it allow one to restrict the data to Professor Gans’ narrow candidate market.



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purchasing ads on a per-click basis,<sup>86</sup> Google effectively ensures that the ads advertisers pay for are relevant to the user viewing those ads. While Google only charges the advertiser if the ad is clicked, publishers are paid for each impression matched using AdX—regardless of whether it is clicked by the user. For Google Ads transactions via AdX, therefore, Google assumes risk on behalf of the advertiser—effectively insuring the advertiser against the possibility that its ad is not displayed to users who find it relevant.<sup>87</sup> In order for such insurance to be sustainable, the amount Google receives from advertisers for clicks must exceed the price it pays publishers for impressions. The difference between these two prices represents Google’s “margin” on buying impressions and selling clicks. Exhibit 6 shows that the average margin on ads purchased from Google Ads from Google Display Network websites via AdX has fluctuated around [REDACTED] between 2017 and 2022, and has declined to below [REDACTED] in 2023.<sup>88</sup>

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Obviously, prior to AdX 2.0, these data are related to AdSense, rather than AdX. Figure 2 uses data that isolate Google Ads CPCs through AdX alone and limited to Professor Gans’ narrow candidate market. This figure also shows declining prices paid by Google Ads advertisers.

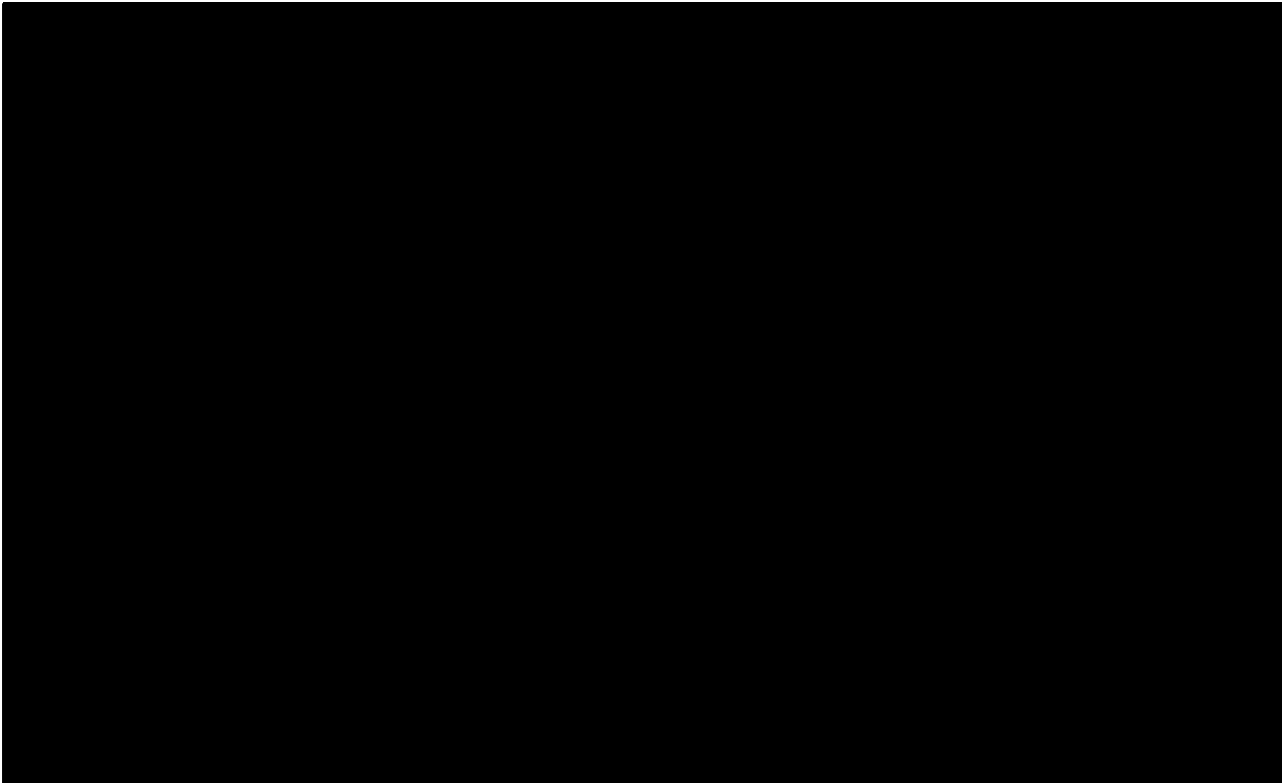
I note that the increase in CPCs around the time of integration of Google Ads and AdX is consistent with thicker markets and higher quality matches resulting in higher auction prices paid by advertisers.

<sup>86</sup> As shown in Figure 3 and Figure 4, the overwhelming majority of advertisers pay for their ads on a CPC basis. The CPC cost model indicated in the figures includes both standard “CPC” and “CPC-to-CPM” in which the advertiser pays on a CPC basis but bids are entered (the publisher is paid) on a CPM basis.

<sup>87</sup> According to Google, “[w]hen advertisers use Google Ads to buy display ads, the vast majority only pay Google when a user takes an action after seeing their ad, such as clicking on the ad, filling out a form or making a purchase. Though Google only charges these advertisers when a user takes an action, we always pay publishers for their ad space sold via Ad Manager. To enable this dynamic, our technology evaluates every impression and converts the advertisers’ business objectives to cost per mille (CPM) bids in advertising auctions to buy publisher ad inventory. By taking on the risk of showing ads to users—regardless of whether the user takes the action the advertiser wants—Google Ads helps buyers and sellers more efficiently pay and earn in ways that best suit their businesses.” [REDACTED], “How our display buying platforms share revenue with publishers,” Google Ad Manager, June 23, 2020, available at: <https://blog.google/products/ads-commerce/display-buying-share-revenue-publishers/>).

<sup>88</sup> It is my understanding that Google does not report this margin in the ordinary course. The figure estimates the Google Ads margin by calculating the overall margin across Google Ads and AdX and subtracting the AdX average revenue share calculated from sell-side data.

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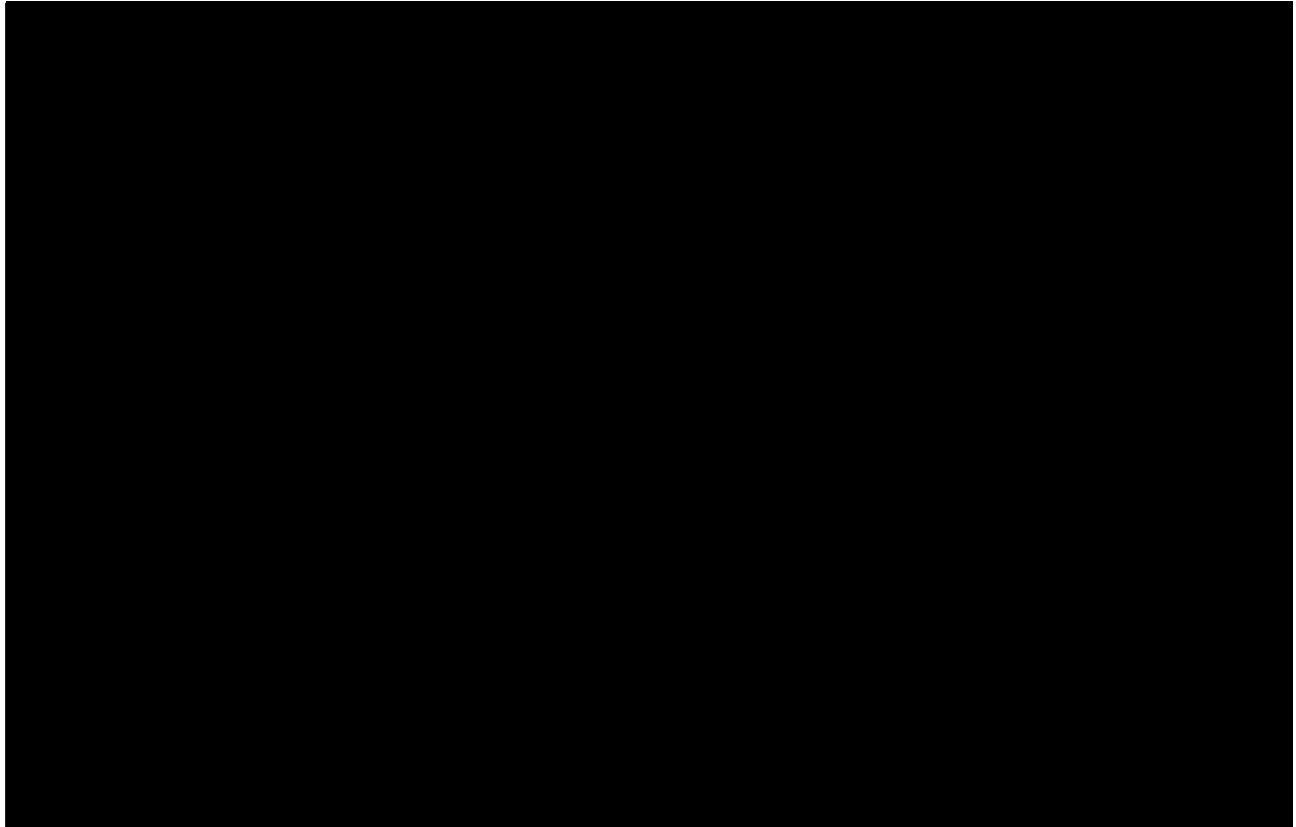


Notes: Cost per click represents the average price paid by advertisers for a click. It has been calculated as total ad spend divided by total clicks.

Source: DOJ RFP 57 Autobidding Data.

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**Exhibit 6**



Notes: The Google margin for Google Ads advertisers is calculated using Google Ads data as gross revenue minus TAC divided by gross revenue. Average monthly AdX fees have been calculated separately using AdX data and subtracted to represent only Google's buy-side tool margin. Google Ads data and AdX data are limited to U.S. advertisers and U.S. publishers respectively.

Source: MDL RFP 243 AdX Data; MDL RFP 243 Google Ads Data.

145) Ad tech companies compete on a combination of quality and price.<sup>89</sup> High fixed costs and low marginal costs make competition on quality particularly important because marginal cost pricing—the textbook outcome that arises in perfectly competitive markets—does not allow the recovery of fixed

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<sup>89</sup> For instance, Google has approved requests for more favorable revenue share takes for various customers. In 2016 these “[p]artners with PBSx asks for OA > 80/20” included: Answers; Fairfax AU; Fox News; Orange; Naspers; CBS; Reddit; Hearst; and eBay. (GOOG-DOJ-05270444, at -454). Google documents indicate that, for example, Magnite and Index Exchange/OpenX, “aggressively compete on price while simultaneously leaning into the supply path optimization narrative in the marketplace to support their path to inventory.” (GOOG-AT-MDL-004300215, at -221).

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costs.<sup>90</sup> More specifically, the cost structures of ad tech firms are highly skewed towards fixed rather than variable costs,<sup>91</sup> as fixed investments are necessary to develop, build, test and improve technologies to efficiently match advertisers with publisher impressions.

146) There is heterogeneity in the fees that different ad tech companies charge customers for using their ad tech.<sup>92</sup> [REDACTED]

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<sup>90</sup> See, e.g., Robert H. Bork and J. Gregory Sidak, “The Misuse of Profit Margins to Infer Market Power,” *Journal of Competition Law & Economics*, Vol. 9, No. 3, pp. 511-530, at p. 518. (“Prices exceeding marginal costs are common in industries with low marginal costs and high sunk costs, such as telecommunications. A mobile operator’s willingness to make continued investments in its network depends on its ability to recover its sunk costs. Because the marginal costs of providing mobile services are low, the firm needs to price its products above marginal cost. A positive profit margin does not, however, indicate market power: rather, it is a function of the firm’s sunk investments. High price-cost margins are necessary to induce investment. They are a perfectly rational business strategy even in a highly competitive market”).

<sup>91</sup> “SSPs largely operate on fixed cost technology, meaning that the bulk of the cost incurred is stable regardless of how much money the buyer spends.” (PubMatic, “Unboxed: Do You Know Where Your Digital Ad Dollars Are Going?” available at: <https://pubmatic.com/blog/unboxed-do-you-know-where-your-digital-ad-dollars-are-going/>. Accessed August 6, 2024.) “DSPs are largely a fixed-cost business dominated by the cost of listening to the bidstream[.]” according to Christ Kane of Jounce Media. (Sarah Sluis, “Investigation: DSPs Charge Hidden Fees – And Many Can’t Afford To Stop,” Ad Exchanger, January 10, 2018, available at: <https://www.adexchanger.com/platforms/investigation-dsps-charge-hidden-fees-many-cant-afford-stop/>).

<sup>92</sup> This includes buying tools (see Figure 5), exchanges (see [REDACTED]), and ad servers. See also, e.g., Adform, “Special Terms and Conditions,” available at: <https://site.adform.com/uncategorized/special-terms-and-conditions/>. Accessed August 6, 2024. (Schedule 1, Section 1 “General fee rules” describes “CPM (Thousand Impressions) based fees,” “Click (CPC) based fees,” etc.); Amazon Ads, “Amazon DSP,” available at: <https://advertising.amazon.com/solutions/products/amazon-dsp>. Accessed August 6, 2024. (“Pricing for ads through Amazon DSP varies depending on format and placement. Self-service customers are in full control of their campaigns, and there are no management fees. The managed-service option typically requires a minimum spend of \$50,000 USD (minimum may vary per country).”); Viant, “Viant’s Adelphic Launches Innovative Subscription Pricing,” available at: <https://www.viantinc.com/company/news/press-releases/viants-adelphic-launches-innovative-subscription-pricing/>. Accessed August 6, 2024. (“Advertisers and agencies currently using Adelphic’s subscription-based model are reducing their DSPs fees by as much as 80 percent, compared to percent of spend pricing models utilized today.”); Microsoft Xandr, “Finance - Charges for sellers,” available at: <https://learn.microsoft.com/en-us/xandr/finance/charges-for-sellers>. Accessed August 6, 2024. (“For contracts which contain a clause that requires a Seller Revenue Share Minimum fee (included on your Buyer invoice for Seller activity during the invoiced period), we review Microsoft Advertising’s earnings from the Seller’s resold traffic and apply a minimum CPM (the exact value applied is defined in the contract).”); Mike McNeeley, “Reflecting on the Economics of Programmatic,” Index Exchange, March 18, 2020, available at: <https://www.indexexchange.com/2020/03/18/exchange-fee-reduction-xfr/>. (“Index assesses one single fee on each transaction conducted on our exchange. That single fee is negotiated directly with the media owners we work with and is often based on volume.”); Amazon Publisher Services, “Unified Ad Marketplace,” available at: <https://aps.amazon.com/aps/unified-ad-marketplace/>. Accessed August 6, 2024. (“UAM charges a 10% transaction fee from SSP and Amazon bid prices prior to conducting a first price auction”); Chris Shuptrine, “How to Determine Your Ad Platform’s Pricing Model and Rates,” Kevel, March 29, 2022, available at: <https://www.kevel.com/blog/how-to-price-ads>. (lists average CPCs (cost per click) of \$5.60 for LinkedIn, \$2.30 for Google, \$1.70 for Facebook, \$0.90 for Amazon, and \$0.60 for Twitter); AdGlare, “Plans & Pricing,” available at: <https://www.adglare.com/pricing>. Accessed August 6, 2024. (the Professional plan is an “[a]d server solution for publishers & advertisers, supporting all ad formats (Display/Native/VAST). Get all targeting features, unlimited accounts. Starting at: \$349/month”); Broadstreet, “Pricing,” available at: <https://broadstreetads.com/pricing/>. Accessed August 6, 2024. (details various options, for example an “Impress” option “[s]tarting from \$299/mo. [f]or both new and established publishers focused on driving sales and efficiency”); AdButler, “Pricing,” available at: <https://www.adbutler.com/pricing.html>. Accessed August 6, 2024. (details various options, for example the “Essentials” option “starts at \$149 /month for 1M ad requests,” and the “Standard” option “starts at \$682 /month for 10M ad requests”).

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[REDACTED]. These patterns are indicative of a competitive environment where firms' primary strategies to attract customers are through investments in quality, features, and services.<sup>93</sup> The economics literature uses the term non-price competition to describe this competitive environment.<sup>94</sup> In this and other high technology industries with vigorous non-price competition, product differentiation is an outcome, rather than a boundary, of competition.<sup>95</sup> Firms attract customers by investing in product features that rivals' technologies lack; differences in products within the industry reflect that competition.

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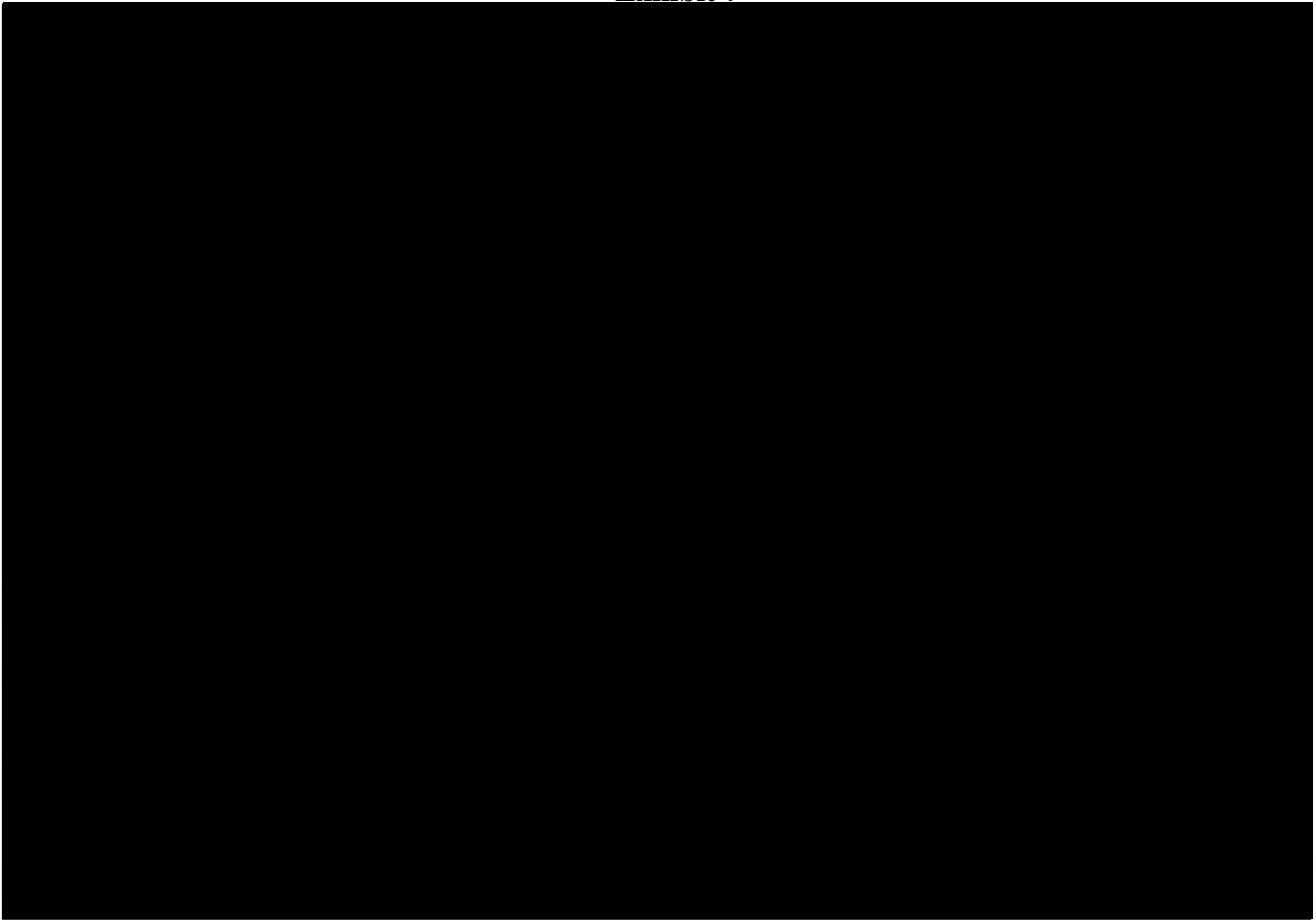
<sup>93</sup> For example, in an internal Google presentation titled "Ads Privacy Competitive Landscape," Google notes that Facebook's "key strengths" include a "[l]arge signed-in user base across [Facebook], [Instagram], Messenger and WhatsApp" and an "[a]d library tool offering a comprehensive, searchable collection of all ads currently running across [Facebook], apps[, and] Instagram." (GOOG-AT-MDL-004299200, at -200, 207). In another internal Google presentation titled "The Trade Desk Competitive Analysis: GCAS lens; GCAS GTM," Google notes that selected customers' "[r]ationale to [m]ove" to The Trade Desk includes The Trade Desk's "[c]ross-device reporting and frequency capping for CTV" and that "[a]gency practitioners prefer [The Trade Desk] due to ease of use." Additionally, Google notes that "[The Trade Desk] is willing to provide hands on servicing." (GOOG-DOJ-AT-01570215, at -215, -219-220). Further, in an internal Google presentation, Google notes that Google had lost "9 publishers ... to AppNexus in [the] last 12 months." and that in 66% of cases, "partnership management was a key factor in the outcome." (GOOG-DOJ-02839847, at -852-853).

<sup>94</sup> "[I]ndustrial economics has advanced substantially from its exclusively static foundations and its pre-occupation with price competition alone. In a dynamic economy competition in product and process innovations may have a more significant effect on welfare, at least in the long run, than does any likely variation in price." See David B. Audretsch, William J. Baumol, and Andrew E. Burke, "Competition policy in dynamic markets," *International Journal of Industrial Organization*, Vol. 19, 2001, pp. 613-634, at p. 614.

<sup>95</sup> "The basis for competition in many high technology industries is fundamentally different ... there is a much greater emphasis on performance-based, rather than price-based, competition. In addition, the competitive dynamic is different as well, with products often highly differentiated and periodic discontinuous paradigm shifts that can completely overwhelm pre-existing market positions." (Christopher Pleatsikas and David Teece, "The analysis of market definition and market power in the context of rapid innovation," *International Journal of Industrial Organization*, Vol. 19, 2001, pp. 665-693, at p. 665).

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**Exhibit 7**



147) Often the prices that different ad tech companies charge for their services are not directly comparable because customer demand depends on the quality of the impressions matched (or produced) by the ad tech. For example, suppose two ad tech companies charge advertisers identical prices of 10 percent on impressions purchased using their buying tools. Company A's ad tech matches an advertiser with a publisher to produce an impression the advertiser values at \$2, while Company B's ad tech

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<sup>96</sup> For a detailed view, see [REDACTED]

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produces an impression it values at \$10. Other things equal, the advertiser clearly prefers Company B's buying tool even though their ad tech fees are identical.<sup>97</sup> A customer's choice to use one company's ad tech over another is often driven by non-price characteristics (e.g., quality of matches produced, functionality or service) and not simply by the fee or revenue share charged.

148) Consequently, ad tech companies engage in intense non-price competition to create value for customers through, e.g., investments, services, and rules of behavior to ensure balanced participation of the customer groups each serves.<sup>98</sup> Ad tech companies also compete by making specific investments for specific customers to improve their individual experiences.<sup>99</sup>

149) Even when the prices charged by an ad tech company are stationary, investments in quality that grow the value of impressions purchased at auction effectively lower quality-adjusted prices. Expressed differently, it would be erroneous to conclude that competition is lacking in the ad tech industry merely because a company grows its output or market share without reducing prices. Companies with higher quality ad tech tend to garner more customers, and therefore ad tech firms tend to compete via investments in quality.

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<sup>97</sup> One may interpret the \$2 and \$10 impression values as values net of fees paid or gross of the value (or return) the advertiser receives from the impressions through, e.g., making additional sales in stores.

<sup>98</sup> The "balanced participation" that an ad tech company seeks will depend upon its mix of ad tech products. An ad tech company that offers only ad buying tools will adopt rules that primarily cater to advertisers, while an ad tech company that offers only publisher ad serving tools will adopt rules that primarily cater to publishers. Thus, even if one considers each component of the ad tech stack as a two-sided market, the mix of ad tech products can drive some companies to consider the effects of its choices less so than other ad tech companies.

<sup>99</sup> Google documents describe losing customers to AppNexus due to "Partnership [Management]." For example, Google lost Alma Media because it "didn't have enough time to spend with the partner as they were classified under a smaller scale partner." (GOOG-DOJ-02839847, at -853).

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**D. The Multi-Sided Nature of the Ad Tech Industry Impacts Competition and Firms' Incentives**

150) Ad tech tools facilitate the matching of advertisers' ads with publishers' inventory.<sup>100</sup> The fee a publisher or advertiser pays to use ad tech is determined when a transaction occurs—i.e., when an advertiser's ad is matched with a publisher's available inventory and viewed or clicked by an internet user.

151) Ad tech tools facilitate “matches” or transactions, and operate in a multi-sided market where the products—transactions—are jointly consumed by multiple sides.<sup>101</sup> Multi-sided platforms exhibit what economists call “indirect network effects,” which refer to situations where the value realized by members of one group of customers (e.g., advertisers) increases when there are more customers on the other side of the platform (e.g., publishers).<sup>102</sup> Multi-sided transaction platforms exhibit pronounced

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<sup>100</sup> Multi-sided markets are sometimes called “two-sided markets.” As David Evans notes, “[o]nline advertising is a ‘two-sided market’... , as is advertising generally.” (David S. Evans, “The Online Advertising Industry: Economics, evolution, and privacy,” *Journal of Economic Perspectives*, Vol. 23, 2009, pp. 37-60, at p. 38).

See David S. Evans and Richard Schmalensee, “Markets with Two-Sided Platforms,” *Issues in Competition Law and Policy* (ABA Section of Antitrust Law), Vol. 1, 2008, pp. 667-693, at p. 667. (According to the two authors, two-sided platforms “serve distinct groups of customers who need each other in some way, and the core business of the two-sided platform is to provide a common (real or virtual) meeting place and to facilitate interactions between members of the two distinct customer groups.”).

<sup>101</sup> For a discussion about multi-sided platforms, see Davis S. Evans, “Governing Bad Behavior by Users of Multi-Sided Platforms,” *Berkeley Technology Law Journal*, Vol. 27, 2012, pp. 1201-1250, at pp. 1203-1204. (“Multi-sided platforms create value by helping two or more different types of users, who could benefit from getting together, find and interact with each other, and exchange value.... There are positive externalities between the multiple types of users. Platforms provide ways to promote these positive externalities and thereby create value for the community of users they serve.”).

<sup>102</sup> See David S. Evans and Richard Schmalensee, *Matchmakers: The New Economics of Multisided Platforms*, Harvard Business Review Press, 2016, at p. 27 (“A network effect is indirect when the value of a matchmaker to one group of customers depends on how many members of a different group participate.”); Catherine Tucker, “Network Effects and Market Power: What Have We Learned in the Last Decade?” *Antitrust*, Spring 2018, pp. 72-79, at p. 72. (“Economists use ‘network effects’ to describe contexts in which a good or service offers increasing benefits the more users it has. Network effects can be direct—for example, a fax machine becomes more useful as other people also use fax machines. Network effects can also be indirect so that they flow across different sets of users. For example, Uber would not be a very useful app for a rider if there were no drivers using the platform. Similarly, drivers would not want to use the Uber app if no riders were using it.”).



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indirect network effects: the value of participation on a transaction platform increases not only with the number of users on the other side, but also with the usage of the platform on the other side.<sup>103</sup>

152) Google's ad tech is a multi-sided platform where the transaction product (a matched advertising impression) is produced when the technology matches an advertiser with a user viewing publisher content.<sup>104</sup> There are indirect network effects because the value of ad tech to an advertiser indirectly depends on the value of the technology to publishers and users viewing their sites, and vice versa. Both sides served by the product benefit from the demand for the products from the other side. The more advertisers that connect to a company's ad tech, the more valuable the ad tech is to publishers because they are more likely to be matched with an advertiser willing to bid a high price for an impression. Likewise, the more publishers that connect to a company's ad tech, the more likely the advertiser is to be matched with an impression the advertiser values. These indirect network effects impact the pricing, quality, and features included in ad tech tools.<sup>105</sup>

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<sup>103</sup> David S. Evans and Richard Schmalensee, *Antitrust Analysis of Platform Markets: Why the Supreme Court Got It Right in American Express*, Competition Policy International, 2019, at p. 13. ("There is a strong presumption that transaction platforms have significant indirect network effects between both groups, and powerful feedback loops, as both types of users are seeking more valuable interactions. It is the nature of exchange that the likelihood of finding a beneficial match, and the expected value of that match, generally increases with the number of relevant choices.").

<sup>104</sup> See Lapo Filistrucchi, Damien Geradin, Eric van Damme, and Pauline Affeldt, "Market Definition in Two-Sided Markets: Theory and Practice," *Journal of Competition Law & Economics*, Vol. 10, 2014, pp. 293–339, at p. 298. ("Two sided transaction markets, such as payment cards, are instead characterized by the presence and observability of a transaction between the two groups of platform users.").

<sup>105</sup> "Digital advertising markets are multi-sided markets, bringing together advertisers on one side of the market, publishers (and content providers) on another, and consumers on yet another ... The success of businesses operating in these markets will depend on their ability to get all sides of the market to 'come to the table'. That is, their ability to attract high-quality ad space (i.e. publishers/content) which attracts consumers, and their ability to attract advertisers ... Multi-sided markets usually involve positive (cross-platform) network externalities such that the value of the platform to players on at least one side of the market increases with the number of players on the other side of the market ... Pricing decisions in multi-sided markets are distinctly different from those in more traditional markets. In particular, multi-sided markets often 'treat one side as a profit centre and the other as a loss leader, or, at best, as financially neutral' ... Further, multi-sided markets may be more prone to economies of scale." (OECD, "Competition in Digital Advertising Markets," 2020, available at: <https://web.archive.oecd.org/2021-10-31/567965-competition-in-digital-advertising-markets-2020.pdf>, at pp. 27-28).

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153) While there are two groups of ad tech customers (advertisers and publishers), I use the term multi-sided market instead of two-sided market to emphasize the important role that a third group (users) play in Google's business decisions.<sup>106</sup> Google's business model critically depends on users having a quality user experience, unmarred by unwanted, annoying, or offensive ads or ads that compromise users' security. The value of Google's ad tech products (Google Ads, DV360, AdX, and DFP) derive from the existence of valuable content for users to consume. Consequently, Google's business decisions must also account for indirect network effects stemming from users. Low-quality content and annoying ads incentivize users to spend less time on the open web and more time on mobile apps and social and other media where advertisers are also able to reach them. These indirect network effects provide Google—as an integrated ad tech stack—with an economic interest in fostering ad supported content on the open web.<sup>107</sup> It has a direct financial incentive to consider the effects of its actions not only on advertisers and publishers, but to continuously improve the quality of its ad tech to (a) protect users from annoying or irrelevant ads,<sup>108</sup> and (b) ensure that users have a quality experience. If users have a poor experience, they will go elsewhere and advertisers will follow.<sup>109</sup> The value of Google's keystone

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<sup>106</sup> I note that the OECD also uses the term multi-sided market. For example, “[d]igital advertising markets are multi-sided markets. . . .” (OECD, “Competition in Digital Advertising Markets,” 2020, available at: <https://web-archive.oecd.org/2021-10-31/567965-competition-in-digital-advertising-markets-2020.pdf>, at p. 27).

<sup>107</sup> Google has a “[b]alanced [f]ocus...on both the buy and sell sides...enabl[ing its] partners to maximize yield and efficiency without increasing operating costs” through “[s]table [t]echnology and [f]ull [s]tack [i]ntegrations” and providing an “unmatched commitment and investment in protections for users, sellers and buyers.” (GOOG-DOJ-11357824, at -828.). In contrast, some ad tech companies that are not full stacks do not have similar incentives to enhance the overall ecosystem. For example, “[b]y focusing solely on their exchange and header bidding technology [Magnite and Index Exchange/OpenX] are able to direct all their efforts on publisher needs.” (GOOG-AT-MDL-004300215, at -221-222).

<sup>108</sup> For example, in an internal strategy presentation, Google notes its membership in the “Coalition for Better Ads” where “Google, Facebook and the World’s Biggest brands Join Together to Improve Digital Ads.” (GOOG-TEX-00348289, at -408).

<sup>109</sup> “[Google] sits at the intersection between advertisers, publishers, and consumers of the web,” and “need[s] to strike a careful balance between maximizing outcomes for advertisers, creating yield for publishers, and providing delightful ad experiences for consumers if [Google is] going to help sustain an ad-supported ecosystem.” (GOOG-DOJ-09712720, at -823). “As a technology provider for both buyers and sellers, Google is committed to helping the industry evolve while maintaining a healthy and growing programmatic ecosystem.” (GOOG-TEX-00110023, at -025).

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product (Google Search) derives from the existence of valuable open web content for users to consume, so Google has an enhanced incentive to continuously improve the quality of its ad tech to ensure that the returns on ad spend that advertisers earn on the web are competitive with what they can achieve by reaching users on social media, apps, and other media. In contrast, the businesses of many of Google's competitors (e.g., Facebook and Amazon) do not depend as extensively upon high-quality content on the open web.<sup>110</sup>

154) As a matter of economics, the presence of indirect network effects means that one must view the impact of a platform's pricing and business decisions on advertisers, publishers, and users holistically rather than separately.<sup>111</sup> The creation of a transaction for the platform requires an advertiser, a publisher, and a user to view and/or click the ad. Any price increase or platform decision that drives an advertiser, publisher, or user away eliminates the transaction for the platform. Even more, with fewer advertisers, the value of impressions sold at auction (and hence publisher and platform revenues) declines, other things equal. This incentivizes publishers to shift some of their content elsewhere or to reduce their investments in content. This not only makes the platform less attractive to advertisers, it may induce users to spend their time elsewhere—further reducing the value of the platform to publishers and advertisers. This “feedback loop” of indirect network effects further reduces the value of impressions purchased and sold at auction and the lost platform revenues may lead the platform to cut investments

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<sup>110</sup> Unlike Google's business model of directing users to the websites of third-party publishers through products like Google search and Google maps, the business models of Facebook and Amazon generally keep users on their properties.

<sup>111</sup> As Evans and Schmalensee note, “[f]or two-sided platforms three results appear to be robust: 1) The optimal prices depend in a complex way on the price sensitivity of demand on both sides, the nature and intensity of the indirect network effects between the two sides, and the marginal costs that result from changing output of each side. 2) The profit-maximizing, non-predatory price for either side may be below the marginal cost of supply for that side or even negative. 3) The relationship between price and cost is complex, and the simple formulas that have been derived for single-sided markets do not apply.” (David S. Evans and Richard Schmalensee, “The Industrial Organization of Markets with Two-Sided Platforms,” *Competition Policy International*, Vol. 3, 2007, pp. 151-179, at p. 160).

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in quality. Analogous feedback loops occur for price increases or platform decisions that drive publishers away from a platform. For these reasons, the fees charged by multi-sided platforms must strike a delicate balance.<sup>112</sup>

155) In fact, a platform that operates its ad tech stack holistically may use network effects to profitably grow its business while sharing the benefits of growth with advertisers, publishers, and users. Consider a platform that adopts the strategy of maintaining the same prices it charged when it entered the industry. It chooses to grow its market share by attracting customers through investments in technology that create matches of higher value, thereby growing the size of the pie shared and benefiting advertisers, publishers, and users alike. These investments make the platform more attractive to advertisers (and publishers) through indirect network effects. By attracting more advertisers, the platform becomes even more valuable to publishers and vice-versa.<sup>113</sup> These effects are reinforced by indirect network effects from users, who have more content to view and are more likely to be matched with a relevant ad. For these reasons, the mere fact an industry appears to be highly concentrated is not, by itself, indicative of a lack of competition.<sup>114</sup> Indeed, network effects and feedback loops are more

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<sup>112</sup> As described in economics literature, businesses operating multi-sided platforms “always have to consider how changing prices on one side of the market will impact the other side of the market.” (David S. Evans, “Antitrust Economics of Two-Sided Markets,” in *Platform Economics: Essays on Multi-Sided Businesses*, ed. David S. Evans, 2011, at p. 105).

<sup>113</sup> As noted in one article recommending Google Ads: “The beauty of Google Ads lies in its ability to reach a vast audience.” (The Yale Ledger, “The Importance of Google Ads – A Business Owner’s Guide,” April 17, 2023, available at: <https://campuspress.yale.edu/ledger/the-importance-of-google-ads-a-business-owners-guide/>). On the other side, AdX and DFP publishers benefit from more participation on the buy-side. For example, one article notes that “AdX allows eligible publishers to gain access to a much bigger pool of demand via campaigns from the best brands and advertisers worldwide. More demand means greater bid competition, which means more ad revenue for publishers.” (Internet Archive, “What is Google Ad Exchange (google adx)?” available at: <https://web.archive.org/web/20231208170203/https://www.adpushup.com/blog/what-is-google-ads-exchange/>. Accessed August 6, 2024).

<sup>114</sup> “Without switching costs, network effects tend to give rise to high market concentration: relative network size gives the larger firm an advantage, making its product more attractive to consumers, which leads to greater network size and greater advantage and propels the larger firm towards capturing most of the market.” (Jiawei Chen, “How Do Switching Costs Affect Market Concentration and Prices in Network Industries?” *The Journal of Industrial Economics*, Vol. 64, 2016, pp. 226-254, at p. 228).

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likely to discipline prices charged by larger platforms than smaller platforms.<sup>115</sup> Furthermore, while reinforcing network effects may naturally lead to a firm with a large market share,<sup>116</sup> network effects do not kill competitive pressures.<sup>117</sup> Economic theory and history teach that small players may overcome network effects enjoyed by larger, more prominent firms—and that a platform’s prominence does not immunize it from competitive pressures.<sup>118</sup>

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<sup>115</sup> For example, if a large platform charges publishers higher fees, the decline in content and quality of ads may induce internet users to increase their use of ad blockers or turn to alternative media. This has a large effect on the entire ecosystem. In contrast, if a small platform charges a handful of publishers higher fees, the overall effect on the use of ad blockers and alternative media is likely to be small: internet users may shift away from those websites but continue to embrace website content as a general matter. Thus, the impact on the entire ecosystem of the small platform’s business decisions is unlikely to induce feedback effects. I discuss these issues in more detail in Section V.E and .

<sup>116</sup> As the Federal Trade Commission notes, “[a successful platform] must attract a large number of participants to both sides of the market, so that each participant has a substantial number of potential matches on the other side of the market (resulting in a “thick” market) ... [and] platforms must make transacting between strangers safe and reliable enough that buyers and sellers feel confident that their transaction will proceed as agreed.” (Federal Trade Commission, “The ‘Sharing’ Economy: Issues Facing Platforms, Participants, and Regulators,” FTC Staff Report, November 2016, available at: [https://www.ftc.gov/system/files/documents/reports/sharing-economy-issues-facing-platforms-participants-regulators-federal-trade-commission-staff/p151200\\_ftc\\_staff\\_report\\_on\\_the\\_sharing\\_economy.pdf](https://www.ftc.gov/system/files/documents/reports/sharing-economy-issues-facing-platforms-participants-regulators-federal-trade-commission-staff/p151200_ftc_staff_report_on_the_sharing_economy.pdf), at pp. 3-4).

<sup>117</sup> If some ad tech businesses are relatively less integrated than others, their incentives to internalize the negative side-effects of choices by any one side of the multi-sided market are relatively lower. For example, an unintegrated publisher ad server primarily serves the interests of publishers, even though advertisers are necessary to monetize a publisher’s impressions. Thus, an unintegrated publisher ad server’s incentives will be less likely to account for the negative externalities associated with publishers’ choices and will be less likely to invest in improvements to the buy-side that do not improve value for publishers. To the extent that the balancing act of an integrated ad tech business produces an overall increasing pie from which advertisers and publishers can benefit, this can lead to further incentives for publishers and advertisers to gravitate toward the integrated platform that experiences growth over time, leading to greater concentration but not necessarily diminishing competition. Indeed, although the integrated firm succeeds by growing the pie for everyone over time, the unintegrated firm may succeed by bending to the immediate incentives of its customers and ignoring the negative externalities it may create. Where multi-homing is possible, as a matter of economic theory, publishers and advertisers could all gravitate toward common usage of a small number of platforms through which they can benefit from the efficiencies and network effects of the platforms’ overall incentives and structure and also observe marginal demand for certain publishers and advertisers to fulfill more specialized roles that directly address heterogeneous needs of their customers.

<sup>118</sup> For example, despite its lack of scale, Facebook rose to prominence as it built a following in which people everywhere were able to connect and share with family, friends, acquaintances, and others. In contrast, despite its prominence and large user base, Google’s attempt at a social network, called Google+, ended “because the features it offered did not provide any advantages over existing social networks.” “In theory, Google Plus should have had network effects and consequent critical mass on its side .... Google Plus quickly failed despite a huge installed user base because the features it offered did not provide any advantages over existing social networks.” See Catherine Tucker, “Network Effects and Market Power: What Have We Learned in the Last Decade?” *Antitrust*, Spring 2018, pp. 72-79, at pp. 74, 78. (competition in the space is ongoing today, as other social media platforms, such as Snapchat and TikTok, destabilize the incumbency of Facebook by successfully leveraging the network effects arising from a growing user base).

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**E. Firms Compete by Offering Different Solutions to Externality Problems**

156) Externalities arise when decision-makers ignore the beneficial or harmful effects of their actions on other actors.<sup>119</sup> For example, a hiker might find it personally advantageous to leave trash on the trail instead of packing it out. This decision imposes negative externalities on the ecosystem because it makes the trail less attractive for everyone else. Externalities also may be positive. For example, another hiker might find it personally advantageous to pick up a pile of trash along the trail and pack it out. This decision results in positive externalities on the ecosystem because it makes the trail more attractive for everyone else.

157) The failure of individual decision-makers to account for negative externalities results in activities that harm a given ecosystem.<sup>120</sup> Economic theory indicates that there are significant externalities within and across Professor Gans' four candidate markets.<sup>121</sup> Individual advertisers and

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<sup>119</sup> Negative externalities by advertisers, publishers and consumers are documented in the academic literature. Shiller et al. document that "... websites, when choosing the extent and invasiveness of ads, do not internalize an externality imposed on other websites. As Ken Fisher, the Founder of Ars Technica, explained, 'The majority of people blocking ads on our site were doing it because other sites were irritating them . . . It's the worst players in the web publishing world that's driving this.' Related even within a website, advertisers do not internalize the externality imposed on other advertisers...." Shiller, Benjamin, Joel Waldfogel, and Johnny Ryan, "The effect of ad blocking on website traffic and quality," *The RAND Journal of Economics*, Vol. 49, No. 1, 2018, pp. 43-63, at p. 61. These authors also provide empirical evidence that the use of ad blocker technology by users to mitigate these problems imposes additional negative externalities on other users, publishers, and advertisers.

<sup>120</sup> This is evident on trails where litterbugs fail to account for the costs they impose on everyone else. From the standpoint of an individual hiker, leaving one piece of trash on the trail may be personally advantageous because it is convenient for them, and a single piece of trash has a negligible impact on the ecosystem. But there are many hikers, and when each does what is personally advantageous, the aggregate amount of litter can be substantial. Similarly, the failure of individual actors to account for positive externalities leads to underinvestment in activities that benefit an ecosystem. This is evident when someone walking a dog "underinvests" in efforts to remove dog waste because he doesn't account for benefits to other pedestrians (and to the ecosystem as a whole) of his removal efforts. Again, while failure of only one person to invest time in removing dog waste may only impose a small negative externality on subsequent pedestrians, the aggregate harm to the ecosystem can be substantial when many dog walkers have incentives to underinvest in cleanup efforts.

<sup>121</sup> The incentives of firms that operate platforms as multi-sided markets are sometimes closely related to the benefits arising from network effects. However, multi-sided markets may be positioned to unleash additional efficiencies to the relevant actors through its internalization of externalities on each side of the multi-sided market in which it operates. That is, if the choices of customers on one side of a market can reduce the welfare of customers on the other side of the market, the operator of the multi-sided market can set prices and incentives to dampen or eliminate those effects. For example, if publishers have incentives to sell ads in ways that diminish the ability of

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publishers account for the impact of their decisions on their own profitability, but do not account for the negative externalities of their actions on other publishers, other advertisers, or users. An individual publisher may profit by bombarding visitors with intrusive ads,<sup>122</sup> distasteful ads, irrelevant ads, pages that load slowly,<sup>123</sup> and so on. Although the overall amount of “littering” by individual publishers impacts the experiences of users—and their users’ expected benefits and costs of using the internet and clicking on ads in the future—an individual publisher may not consider how its “litter” may turn users away from content on the internet more generally. Likewise, individual publishers and advertisers do not take into account the positive externalities of their investments in a “clean” ecosystem. Failure to account for these externalities diminishes the value of the ecosystem. Because thousands of advertisers and

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advertisers to detect fraud or measure the viewability of impressions, the multi-sided platform operator would internalize these effects through the harm that the publishers’ choices could inflict to the value that advertisers get from their display ads. Increased fraud or diminished measurability will mean that advertisers shift their ad budgets to other ecosystems, leading to lower fees for the platform as well. Just as a hiker may not care about the effect of their own littering on everyone else, a small number of publishers engaging in these practices spoil the ecosystem for everyone—but the platform operator will have an incentive to invest in systems that counteract the detriment from those publishers in order to maintain strong advertiser demand.

<sup>122</sup> See, e.g., Matthew Lawrence Garcia, “The dangers of made-for-advertising websites (MFAs),” Blockthrough, November 15, 2023, available at: <https://blockthrough.com/blog/the-dangers-of-made-for-advertising-websites/>. (“A made-for-advertising website is essentially a website designed to maximize the number of ads shown to users. They include numerous ads on each page and offer manipulative user journeys that prompt users to click through various pages to access content. MFAs will use clickbait headlines to draw in users, only for them to realize that these sites mainly consist of ads rather than quality content....[MFAs] acquire clicks to generate advertising revenue, even if their sites are often little more than spam.”); Seb Joseph, “WTF are made-for-advertising sites (MFAs),” Digiday, September 18, 2023, available at: <https://digiday.com/marketing/wtf-are-made-for-advertising-sites-mfes/>. (“Firstly, WTF is an MFA site? Picture a web page overrun by towering banner ads and strategically positioned video ad players, morphing the browsing experience into a cacophony of commercial chaos.”); Google Search Central, “Spam policies for Google web search,” available at: <https://developers.google.com/search/docs/essentials/spam-policies>. Accessed August 6, 2024. (Google also has spam policies that “help protect users and improve the quality of search results.”).

<sup>123</sup> “Q. ...If a publisher was able to generate 30 to 40 percent from header bidding, might it be in the publisher’s interest to increase the latency of their page to some extent to generate 30 to 40 percent additional revenue? A. My belief at the time was that publishers were doing more damage to their long-term business by increasing latency than the short-term revenue benefits they were getting.” (Deposition of [REDACTED] (Google) on October 2, 2020, GOOG-AT-MDL-007169640, (hereafter “[REDACTED] (Google) Deposition”), at 234:6-14). Regardless of whether these individual publishers were behaving myopically, their decisions imposed negative externalities on other users of the open web ecosystem. Google was also heavily invested in ensuring that their advertisers and publishers remained free of spam ads and fraudulent inventory. “[W]e can have very good spam detection on the inventory when the publisher is using our ad tags, for example....And that’s, again, in an effort to make sure that the inventory that advertisers are buying is clean and spam free.” (Deposition of [REDACTED] (Google) on December 9, 2021, GOOG-AT-MDL-007172733, at 206:22-25, 207:5-8).



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publishers use the open web, and millions of users view these ads, this aggregate harm to the whole ecosystem can be large even if the harm to any one economic actor is small.<sup>124</sup>

158) Externalities impact the welfare of customers in the candidate markets in other ways. For example, a company operating only an ad server ignores the externalities of its investments and pricing decisions on users of buying tools and ad exchanges.<sup>125</sup> Such externalities harm the digital ad ecosystem because they result in lower investments and higher ad server fees—and hence, lower quality and output.<sup>126</sup> One competitive solution to this problem is integration. The integration of the ownership of an ad buying tool, ad exchange, and ad server into an ad tech stack may be viewed as the vertical integration of a supply chain that matches a particular ad to (or with) a particular user visiting a particular publisher’s website.<sup>127</sup> It is well documented in the economics literature that common ownership allows

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<sup>124</sup> Many advertisers and publishers buy and sell these impressions, which may be viewed by millions of internet users who surf the web. In the U.S. alone, there are as many as 312 million internet users, constituting over 95 percent of the total U.S. population. *See* Mark Williams, “The USA has just 6% of the world’s 5.2 billion internet users as Pandemic Y2 drives publishing online,” *The New Publishing Standard*, June 15, 2021, available at: <https://thenewpublishingstandard.com/2021/06/15/the-usa-has-just-6-of-the-worlds-5-2-billion-internet-users-as-pandemic-y2-drives-publishing-online/>. (showing 312.3 million Internet users and 95.6% Internet penetration in the USA in Q1 2021).

<sup>125</sup> In a deposition, [REDACTED] (a product management director at Google) mentioned that “a lot of the other players in this market were start-ups or small companies that were pursuing short-term revenue situations and exits or trying to get bought ... [s]o we just did not have confidence that other people would be authentically trying to fairly work on the benefit of the ecosystem over time. They could be driving short-term decisions that were good for their business in the short run, but bad over a longer period of time.” [REDACTED] (Google) Deposition, GOOG-AT-MDL-007169640, at 214:1-11).

<sup>126</sup> In deposition, [REDACTED] (a product management director at Google) stated that he “believed that a lot of the other entities in the ecosystem were not nearly as concerned about the long-term health of the ecosystem or the long-term health of the open web so that they might be motivated to make short-term decisions that were bad for the industry in the long run.” [REDACTED] (Google) Deposition, GOOG-AT-MDL-007169640, at 248:22-249:3).

<sup>127</sup> I note that the integration of ownership of an ad tech stack may also allow for better technical integration of features across components of the ad tech stack.



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the common owner to internalize externalities across the supply chain, resulting in lower prices and higher quality.<sup>128</sup> I discuss this in more detail in Section VIII.

159) Not surprisingly, therefore, some ad tech companies (e.g., Google,<sup>129</sup> Microsoft, Amazon, and Meta) have used integration as a competitive strategy to solve externality problems in their attempts to offer customers a more competitive mix of price and quality.<sup>130</sup>

160) Other companies have different approaches to managing the externalities that ultimately impact the welfare of advertisers, publishers, and users. Some companies attempt to provide a competitive mix of price and quality by specializing in only one ad tech component (e.g., the Trade Desk primarily earns revenues from its buying tool) however, these firms have reduced economic incentives to account for the externalities their business decisions might impose on advertisers or publishers using ad exchanges or ad servers. Some companies (e.g., Meta) solve externality problems by walling off their

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<sup>128</sup>An unintegrated supply chain generally leads to higher prices (due to double marginalization) and underinvestment in specific investments, therefore reducing quality and the value of an ecosystem. See, e.g., Michael R. Baye and Jeffrey Prince, *Managerial Economics and Business Strategy*, Edition 10, McGraw Hill, 2022; Michael Riordan and Steven Salop, “Evaluating Vertical Mergers: A Post-Chicago Approach,” *Antitrust Law Journal*, Vol. 63, No. 2, 1995, pp. 513-568; Paul L. Joskow, “Market Imperfections versus Regulatory Imperfections,” *CESifo DICE Report*, Vol. 8, No. 3, 2010, pp. 3-7; Michael D. Whinston, “On the Transaction Cost Determinants of Vertical Integration,” *The Journal of Law, Economics, and Organization*, Vol. 19, No. 1, 2003, pp. 1-23.

<sup>129</sup> Consistent with economic theory, documents indicate that Google’s decision to integrate was driven by competition. A Google strategy presentation from 2006 emphasizes this on multiple facets of integration: “If our competitors offer full suite of ecommerce services and we offer only ads, our advertiser relationships will dwindle.” Further, Google recognized that they needed to “[r]elease Google [Analytics] v2.0 [to be] integrated with AdSense,” since, in part, “[a]dvertisers don’t have tools to understand users and track ‘after the click’.” Moreover, Google recognized that a competitor integrating with DoubleClick or Atlas would give them “access to 90% of agency desktops [and] lock us out of branding.” (GOOG-DOJ-01861309, at pp. 8, 14).

<sup>130</sup> For example, Google documents indicate that Amazon accounts for externalities by using “[m]argins taken from ad tech allow[ing] Amazon to lower prices on products increasing user purchase behavior creating a virtuous circle.” Amazon also features “low cost solutions, unique demand and effective targeting” and its “proprietary data [ ] based on user purchase and shopping behavior.” (GOOG-AT-MDL-004300215, at -219-220).

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ecosystem to third-party ad tech. Some companies (e.g., Disney, Reddit, and Walmart) deal with externalities by creating and using ad tech to sell digital advertising on their respective properties.<sup>131</sup>

161) Unlike an ad tech company that earns revenue solely from an ad server or a buying tool, a company that operates an integrated ad tech stack internalizes externalities across its entire stack. An integrated ad tech stack therefore has a stronger economic incentive to balance the interests of advertisers, publishers, and users.<sup>132</sup> Google documents, for instance, indicate that “Google Display Media sits at the intersection between advertisers, publishers, and consumers of the web” and must “strike a careful balance between maximizing outcomes for advertisers, creating yield for publishers, and providing delightful ad experiences for consumers if [Google is] going to help sustain an ad-supported ecosystem.”<sup>133</sup> Furthermore, “[a]s a technology provider for both buyers and sellers, Google

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<sup>131</sup> Todd Spangler, “Why Disney Built Its Own Ad Server for Disney+ and Hulu – and What the YODA Does,” *Variety*, January 22, 2023, available at: <https://variety.com/2023/digital/news/disney-ad-server-tech-disney-plus-yoda-1235497663/>; Internet Archive, “Reddit: ads.txt,” available at: <https://web.archive.org/web/20200805165649/https://www.reddit.com/ads.txt>. Accessed July 22, 2024; (Rich Lehrfeld, “Walmart Connect Launches Its New Demand-Side Platform, Walmart DSP, To Expand Its Off-Site Media Offerings at Scale,” *Walmart*, August 25, 2021, available at: <https://corporate.walmart.com/news/2021/08/25/walmart-connect-launches-its-new-demand-side-platform-walmart-dsp-to-expand-its-off-site-media-offerings-at-scale>).

<sup>132</sup> Information in the record is consistent with Google accounting for the impact of its decision making on all sides of its integrated ad tech stack. For example, Google has described stack integration as being the central pillar of AdX’s value which takes a “[b]alanced [f]ocus ... on both the buy and sell sides...enabl[ing] [its] partners to maximize yield and efficiency without increasing operating costs” through “[s]table [t]echnology and [f]ull [s]tack [i]ntegration” and providing “unmatched commitment and investment in protections for users, sellers and buyers.” (GOOG-DOJ-11357824, at -828).

<sup>133</sup> GOOG-TEX-00656701, at -800. In other internal documents, Google lays out its “mission” to “[h]elp media sellers of all types (publishers, broadcasters, online services, app developers) thrive and create sustainable businesses with advertising.” (GOOG-TEX-00348289, at -297). Moreover, in internal strategy documents, Google discusses investments to make the internet more usable to users: “Users are struggling to find value on the web because of slow, janky, reflowing, ad-loaded, pages optimised for click-and-run users, with poor quality content and sites not designed to keep users engaged. Deeper integration ... re-aligns incentives between users, publishers, and advertisers. It delivers value to users through lightning-fast tailored ... ad experiences and more compelling (and higher quality) content; delivers value to advertisers via new formats and more traffic; delivers value to pub[lisher]s via better monetization, new traffic acquisition routes, reducing the effect of ad blocking; and value to Google by keeping users engaged on the GDN network.” (GOOG-TEX-00600302, at -303).

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is committed to helping the industry evolve while maintaining a healthy and growing programmatic ecosystem.”<sup>134</sup>

162) Regardless of how different ad tech companies choose to address externalities, they compete with each other across the ad tech stack. For example, Google documents describing the ad tech competitive landscape identify AppNexus and Adform as “full-stack competitors” and indicate how other companies like Amazon, Facebook, and Rubicon compete with Google’s stack.<sup>135</sup>

163) Because companies compete by offering different solutions to externality problems, differences in their approaches are features of competition and do not define boundaries of competition or otherwise imply that their products do not compete.<sup>136</sup>

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<sup>134</sup> GOOG-TEX-00110023, at -025. In an internal Google presentation, Google also notes other contributions to the programmatic ecosystem by “[being] open to work with any [third parties] as long as [Google] can keep privacy first and measure [its] media right” and by “work[ing] with [third-party] non-profits to develop industry-wide approaches to problems that require industry collaboration.” (GOOG-DOJ-27710710, at -738).

<sup>135</sup> GOOG-TEX-00348289, at -310. In additional Google documents, Google notes that “Appnexus has moved decisively to a full stack play and is positioned as the direct alternative to Google.” (GOOG-DOJ-05526944, at -946).

<sup>136</sup> In these economic settings, the value proposition of the integrated firms’ product offering is likely to focus on differentiation. That is, a small number of more prominent firms may compete against each other for, e.g., a greater share of advertisers’ ad spend budgets by highlighting their differences. Meta can compete against Google and others for advertiser dollars by emphasizing the depth of its user profiles while Google can compete against Meta and others by emphasizing the breadth of its targeting capabilities. This differentiation does not splinter the market nor diminish competition any more than one automobile manufacturer’s insistence of the differentiation of its SUVs as especially luxurious or capable should be taken to mean it does not compete over the infra-marginal demand from all other SUVs or to mean that they operate in separate antitrust markets.

Also in these economic settings, the value propositions of unintegrated firms’ product offerings are likely to highlight specialization. Many ad tech businesses that offer services in Professor Gans’ candidate relevant markets do express the value of their services as specialized and/or excelling in particular needs that are important to subsets of publishers or subsets of advertisers. Below are examples of this type of competition among ad tech companies.

The Trade Desk, one of the largest demand-side platforms, has made specific investments to deal with vast amount of real-time and batch data, prioritizing a shift to cloud-based data management “because it helps [The Trade Desk] build out [their] global footprint in being geographically close to [their] on-premises customers.” (Snowflake Blog, “How The Trade Desk Uses the Data Could to Thrive in the Dynamic AdTech World,” December 16, 2021, available at: <https://www.snowflake.com/blog/how-the-trade-desk-uses-the-data-cloud-to-thrive-in-the-dynamic-adtech-world/>). Investing heavily in technology to make their single product most efficient for users helps The Trade Desk market itself as an industry leader and compete against integrated systems.

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**F. Competition in Ad Tech Is Intense**

164) Ad tech industry spending on display ads has grown rapidly from 2008 to today (*see* Exhibit 8). Because ad tech fees have not increased, these data are consistent with publishers as a whole benefiting from competition and earning greater revenues. Government data indicate that the prices for internet display ads have decreased relative to the rate of inflation.<sup>137</sup> These data are consistent with advertisers as a whole benefiting from ad tech competition and paying lower prices for ads in real terms. As discussed earlier, click-through rates have improved over time. These data are consistent with users as a whole benefiting from competition as they are matched with more relevant ads. Industry data are also consistent with increased quality of ad tech over time.<sup>138</sup> Broadly, these patterns are consistent with vigorous competition.

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Criteo has specialized in creating a buying tool specifically geared toward retail advertisers. By focusing on a single industry, Criteo is able to tailor their product to be particularly useful to retail advertisers, who may choose to trust a platform like Criteo which boasts an AI engine that “analyzes 120+ shopper intent signals from 35B daily browsing and buying events.” (Criteo, “Commerce Max,” available at: <https://www.criteo.com/platform/commerce-max/>. Accessed August 2, 2024). When making decisions about marketing budgets, highly specialized advertisers may prioritize a platform like Criteo, which is going to specifically address their needs.

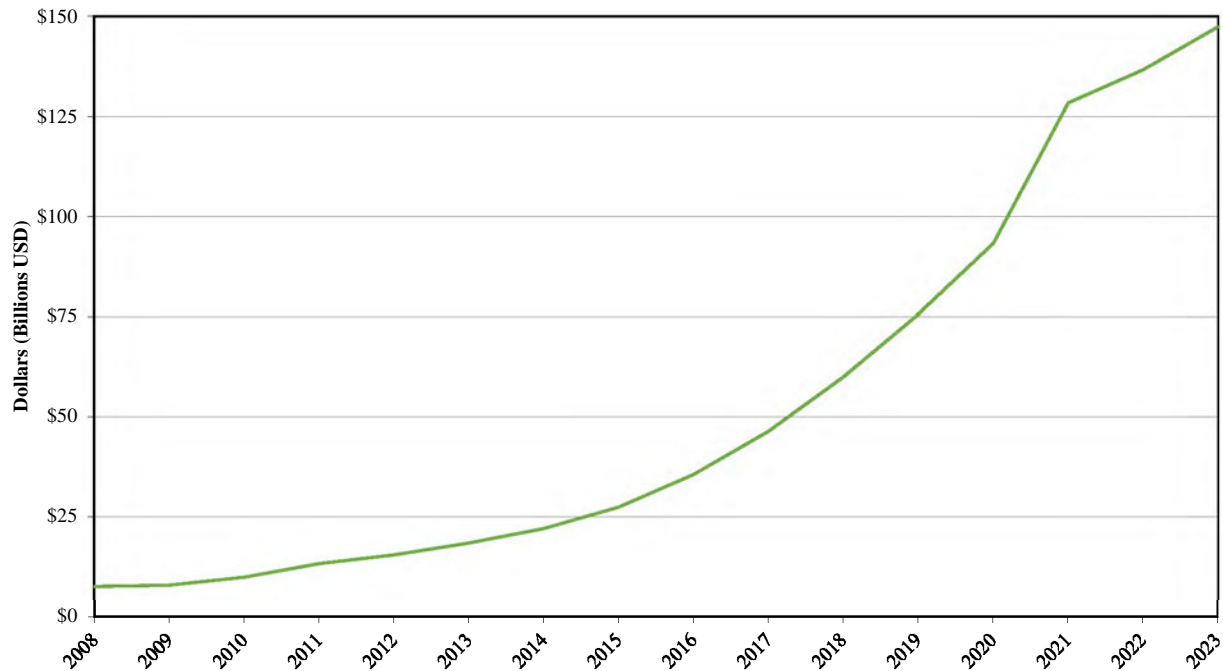
Flipkart Commerce Cloud (FCC) offers a one-stop sell-side platform solution that simplifies and enhances the ad management process for retailers and e-commerce players globally. Their retail media advertising platform “understands the online shopping journey of users, and their current shopping intent and places relevant, personalized ads using advanced AI/ML algorithms.” (Flipkart Commerce Cloud, “Flipkart launches ‘Flipkart Commerce Cloud’ to provide retail intelligence solutions to retailers and e-commerce companies globally,” available at: [https://storiesflistgv2.blob.core.windows.net/stories/2023/10/051023\\_Final-Press-Release\\_Flipkart-Commerce-Cloud\\_v3-.pdf](https://storiesflistgv2.blob.core.windows.net/stories/2023/10/051023_Final-Press-Release_Flipkart-Commerce-Cloud_v3-.pdf), at p. 2. Accessed July 25, 2024).

<sup>137</sup> *See* Figure 7.

<sup>138</sup> For example, “[t]he IAB Tech Lab’s ads.txt program aims to reduce counterfeit inventory (e.g. domain spoofing).” Ads.txt were introduced in 2017 and by Q3 of 2018, an industry commentator found that “domains with ads.txt have a 22% lower ad fraud rate compared to those without ads.txt.” (Tyler Loachner, “Ads.txt lowers ad fraud 22%, but can’t keep up with the growing threat,” PixaLate, December 11, 2018, available at: <https://www.pixalate.com/blog/ads-txt-lowers-ad-fraud-but-invalid-traffic-persists>; Alise Zaiceva, “Ads.txt Guide | What is It and How to Implement It?” Setupad Blog, December 22, 2021, available at: <https://setupad.com/blog/ads-txt-guide-for-publishers/>). Further, another study found that the “[d]etection ad rate of ad blocking on computer” has decreased from 23 percent in Q3 of 2016, to 21 percent in Q2 of 2018, to 18 percent in Q2 of 2020. (Brian Dean, “Ad Blocker Usage and Demographic Statistics,” Backlinko, February 12, 2024, available at: <https://backlinko.com/ad-blockers-users>).

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**Exhibit 8**  
**U.S. Display Ad Spending**  
**2008 - 2023**



Notes: Data are estimates from eMarketer. Display ad spending includes advertising that appears on desktop and laptop computers, mobile devices, tablets, and other internet-connected devices. It also includes ad formats such as banners, rich media, sponsorships, video, and social network ads.

Source: DOJ RFP 57 eMarketer Data – “U.S. Ad Spending 2023.”

***1. Google’s Ad Buying Tools Compete with Hundreds of Alternative Ways that Advertisers Can Purchase Display Ads***

165) Google Ads and DV360 are by no means the only ways that advertisers can purchase display ads. In addition to negotiating deals directly with publishers, advertisers have hundreds of other ways to submit bids to purchase display ad impressions. Google’s data alone show that advertisers purchase ads on AdX using over 600 avenues, including various demand-side platforms, ad networks, and agency

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trading desks.<sup>139</sup> Data indicate that, between June 2013 and March 2023, advertisers purchased at least 5 billion impressions from each of 40 different avenues for buying display ads.<sup>140</sup>

166) Google's competitors use a variety of different business strategies to compete with DV360 and Google Ads. This differentiation is an outcome of competition among buying tools, not a boundary of competition. For example, social media companies operate their ad buying tools within a closed system.<sup>141</sup> Other companies use multiple advertising platforms.<sup>142</sup> And other companies specialize in producing advertiser buying tools in specific fields, allowing them to gain a competitive advantage by catering to the needs of specific advertiser segments.<sup>143</sup>

**2. Google's Ad Exchange Competes with Hundreds of Alternative Ways that Advertisers and Publishers Can Connect**

167) Publishers and advertisers have a variety of ways to connect to buy and sell digital ads, including ad exchanges, ad networks, and direct deals. Google data indicate that at least 65 ad exchanges

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<sup>139</sup> Google's data refer to the avenue through which advertisers' real-time bids are submitted into AdX auctions as "authorized buyers." (Google, "Authorized Buyers overview," available at: <https://support.google.com/authorizedbuyers/answer/6138000>. Accessed August 6, 2024). Bids submitted by third-party exchanges into Open Bidding auctions compete against the winning authorized buyer bid into AdX.

<sup>140</sup> See Figure 8.

<sup>141</sup> For example, "Facebook has an advertising platform that advertisers log into in order to buy ads. . . . That is a platform that advertisers log into to buy ads and directly competes for budgets with Display & Video 360 and Google Ads." (Deposition of [REDACTED] (Google) on May 2, 2024 (hereafter "[REDACTED] (Google) Deposition"), at 84:19-85:3).

<sup>142</sup> See, e.g., [REDACTED] (Google) Deposition, at 85:4-13 ("Q. And what about Amazon? Is Amazon -- does Amazon have a buy-side and ad-buying tool that is a direct competitor of DV360? A. Amazon has, to my understanding, multiple advertising platforms, and those platforms provide advertisements for display and video that directly compete for budgets with Display & Video 360 and with Google Ads.").

<sup>143</sup> For example, in internal documents, Google described Criteo's strong presence in the retail field: "[Criteo p]rovides a solution with product ads that click onsite, keeping the user on the retailer site. They are considered the incumbent player with over 100 retailers and 500+ brands signed to their network." (GOOG-AT-MDL-004300215, at -222). Another example of a specialized ad-tech company is the SSP, Viant. In her deposition, [REDACTED], a Google managing director, describes Viant as an AdX competitor, stating that "brands will use [Viant] rather than using AdX because of [Viant's] sophistication in the health -- in health advertising or over-the-counter advertising." (Deposition of Darline Jean (Google) on May 1, 2024 (hereafter "[REDACTED] (Google) Deposition"), at 160:23-161:2).

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have competed with AdX through header bidding or Open Bidding since 2018.<sup>144</sup> Publicly available data and information indicate that AdX competes with hundreds of ad networks and ad exchanges that connect advertisers and publishers.<sup>145</sup>

168) Google's competitors use a variety of different business strategies to compete with AdX. Some competitors, including Microsoft, offer exchanges that transact a variety of different ad formats. PubMatic is an ad exchange that also transacts a variety of ad formats but specializes in connecting advertisers and publishers transacting ads within mobile browsers.<sup>146</sup> Comcast's FreeWheel is an ad exchange that specializes in connecting advertisers and publishers to buy and sell video ads.<sup>147</sup> Taboola is an ad network whose platform specializes in connecting advertisers to authorized publishers based on publishers' content recommendations to target advertisers' campaign audience.<sup>148</sup>

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<sup>144</sup> See Figure 9.

<sup>145</sup> See, e.g., Google, "Supported display exchanges," available at: <https://support.google.com/displayvideo/table/3267029>. Accessed July 25, 2024; Prebid, "Prebid.js Bidder Params," available at: <https://docs.prebid.org/dev-docs/bidders.html>. Accessed July 25, 2024; Prebid, "Prebid Server Bidder Params," available at: <https://docs.prebid.org/dev-docs/pbs-bidders.html>. Accessed July 25, 2024; Microsoft, "Exchange service," available at: <https://learn.microsoft.com/en-us/xandr/bidders/exchange-service>. Accessed July 25, 2024; Amazon Publisher Services, "Transparent Ad Marketplace," available at: <https://aps.amazon.com/aps/transparent-ad-marketplace/>. Accessed July 25, 2024. ("What are the available demand partners [on Amazon's Transparent Ad Marketplace]? 50+ buyers are working with TAM, and the number is constantly growing. Partners include: OpenX, Magnite, Smaato, SpotX, TripleLift, Verve, Xandr.").

<sup>146</sup> As early as 2020, "[a]bout 55% of PubMatic's business comes from mobile web and app ads, and it also places ads on short-form digital videos." (Megan Graham, "PubMatic, a 14-year-old ad tech company, pops nearly 50% on IPO," CNBC, available at: <https://www.cnbc.com/2020/12/09/pubmatic-an-ad-tech-company-pops-nearly-50percent-on-debut.html>. Accessed July 16, 2024). "The PubMatic SSP...bring[s] together technical innovation, unique demand, and sophisticated analytics to ensure you are in control of your revenue opportunities and user experience across the channels and formats that matter: CTV, online video, mobile app, web, and beyond." (PubMatic, "PubMatic SSP: Maximize Advertising Revenue and Control How Your Audiences are Accessed," available at: <https://pubmatic.com/products/pubmatic-ssp-for-publishers/>. Accessed July 16, 2024).

<sup>147</sup> "Our supplier technology offers a unified platform that enables access to demand and fluid delivery across all endpoints. Use [SupplySuite] to connect directly to buyers...and activate first- and third-party data." (FreeWheel, "SupplySuite," available at: <https://www.freewheel.com/supplysuite>, Accessed August 6, 2024); "FreeWheel...provides comprehensive ad platforms for publishers, advertisers, and media buyers. Powered by premium video content...we're making it easier for buyers and sellers to transact across all screens." (FreeWheel "About," available at: <https://www.freewheel.com/about>. Accessed July 16, 2024).

<sup>148</sup> "Taboola is the world's largest discovery platform. Through our exclusive partnerships with many of the world's top publishers, we serve 360 billion content recommendations to over one billion people across the web each month ... we help thousands of advertisers reach their audiences with compelling native ads in a brand-safe environment." (Taboola Help Center, "How Taboola Works: Overview," available at: <https://help.taboola.com/hc/en-us/articles/115006597307-How-Taboola-Works>. Accessed May 17, 2024).



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**3. Google's Publisher Ad Server Competes with a Variety of Other Publisher Ad Servers**

169) In general, publisher ad servers facilitate the management and sale of publishers' ad inventory across a wide variety of demand sources and types of transactions. Google's publisher ad server GAM (formerly DFP) competes with numerous other companies that offer ad serving solutions to publishers. Publicly available data indicate that DFP competes with a variety of other publisher ad servers, including many publishers that have backward integrated into ad serving.<sup>149</sup>

170) Companies that offer publisher ad server solutions also deploy a wide variety of business models to attract and retain publishers adopting differentiated capabilities and commercial strategies. For example, companies like Google and Microsoft (Xandr) offer fully integrated ad tech stacks to serve all sides of the market.<sup>150</sup> Other companies, like OpenX, choose to specifically focus on segments of the publisher side to partially integrate their offerings.<sup>151</sup> Others, like Kevel, offer white label ad serving infrastructure allowing publishers to build custom ad solutions.<sup>152</sup> Publishers who provide content

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<sup>149</sup> See Figure 10.

<sup>150</sup> Microsoft (Xandr) offers an integrated ad tech stack. See Microsoft Advertising, "Microsoft Invest DSP," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/advertiser-platform-invest-dsp-premium-content>. Accessed July 16, 2024. The two parts of Microsoft Monetize are the Microsoft Monetize SSP (Microsoft Advertising, "Microsoft Monetize SSP," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/publisher-platforms-scaled-buying-selling-solutions>. Accessed July 16, 2024) and the Microsoft Ad Server, which is "a strategic selling platform that provides holistic inventory management controls and differentiated buyer demand to enable you to unlock the full value of your inventory" (Microsoft Advertising, "Microsoft Monetize," available at: <https://about.ads.microsoft.com/en/solutions/technology/microsoft-monetize>. Accessed July 16, 2024).

<sup>151</sup> OpenX offered a publisher ad server called OnRamp and an exchange called LiftDNA. (See Zach Rodgers, "OpenX Shuts Down Its OnRamp Ad Server After Big Malware Attack," Ad Exchanger, February 11, 2013, available at: <https://www.adexchanger.com/online-advertising/openx-shuts-down-its-onramp-ad-server-after-big-malware-attack/>; AdExchanger, "OpenX Adds LiftDNA To Serve Publishers And Their Ad Server Needs Says CEO Cadogan," February 27, 2012, available at: <https://www.adexchanger.com/yield-management-tools/openx-liftdna/>).

<sup>152</sup> [REDACTED]



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through Apple News do not pay Apple any fees for their ad serving product, Apple Workbench.<sup>153</sup> Publishers can also utilize free, open-source ad serving tools.<sup>154</sup> Finally, many companies have developed their own ad serving tools for use with their own web and mobile properties rather than rely on third parties for ad serving tools.<sup>155</sup>

#### ***4. Ad Tech Firms Compete through Price and Investments in Quality***

171) Documents in the record indicate that Google and its rivals compete for customers through product innovations that improve quality for advertisers, publishers, and users.<sup>156</sup> Examples include innovations that mitigate fraud,<sup>157</sup> protect user privacy,<sup>158</sup> improve matching to mitigate users' incentives

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<sup>153</sup> "Apple doesn't apply ad serving fees." (Ads on Apple News, "Generate Revenue," available at: <https://support.apple.com/guide/adguide/generate-revenue-apd51c721ca9/1.0/icloud/1.0>. Accessed August 4, 2024). Similarly, Google does not charge publishers ad serving fees for using Google's Ad Mob, its in-app ad mediation platform. (Google AdMob Help "Costs," available at: <https://support.google.com/admob/answer/7356092#zippy=do-i-have-to-pay-to-use-admob>. Accessed July 16, 2024).

<sup>154</sup> "Revive Adserver is the world's most popular, free, open source ad serving system," (Revive Adserver, "Revive Adserver," available at: <https://www.revive-adserver.com/>. Accessed August 6, 2024).

<sup>155</sup> Examples include Pinterest and eBay, which each created proprietary ad tech products to serve ads on their platforms that are specifically targeted towards their users. (Pinterest Ads, "Grow your business with Pinterest ads," available at: <https://ads.pinterest.com/>. Accessed August 6, 2024; eBay Ads, "Ways to Advertise," available at: <https://www.ebayads.com/ad-solutions/ways-to-advertise/>. Accessed July 16, 2024).

<sup>156</sup> For example, when speaking about her previous experience working for a publisher, Google managing director [REDACTED] explained that "within the course of [about ten years], [her company, About.com] did evaluate other ad servers in the potential of switching. ... At that point in time when [About.com] look [sic] at the technology, right, [it was] more concerned about which technology is going to drive better performance, but also better dollars for [About.com]. So evaluating other technologies is something that [About.com] would have done before agreeing to do business with Google because they're not the end-all, be-all at the time. Because that's what [About.com] used to say, they're not the end-all, be-all." ([REDACTED] (Google) Deposition, at 139:6-22).

<sup>157</sup> For instance, in November of 2023, Google launched its "Limited Ads Serving policy, which is designed to protect users by limiting the reach of advertisers with whom [they] are less familiar." This policy "implemented a 'get-to-know-you' period for advertisers who don't yet have an established track record of good behavior." During this period these advertisers' ads may be limited in some aspects. Google is also working to increasingly incorporate AI and Large Language Models in its fraud prevention efforts. (Duncan Lennox, "Our 2023 Ads Safety Report," Ads & Commerce Blog, March 27, 2024, available at: <https://blog.google/products/ads-commerce/google-ads-safety-report-2023/#enforcement>). Additionally, in 2020, Google introduced its advertiser identity verification program to limit fraud and scams. This allows Google to verify the identity of advertisers in order "to share the advertiser name and location in [Google's] About this ad feature, so that people know who is behind a specific ad and can make more informed decisions." (Scott Spencer, "Our annual Ads Safety Report," India Blog, March 17, 2021, available at: <https://blog.google/intl/en-in/products/google-companies/our-annual-ads-safety-report/>. Accessed August 6, 2024).

<sup>158</sup> In 2020, Google Chrome announced its intent to stop supporting third-party cookies in order to protect the privacy of users. One resulting innovation was Google's test of the Federated Learning of Cohorts API, which was considered to be "one way to effectively take third-party cookies out of the advertising equation and instead hide individuals within large crowds of people with common

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to employ ad blocking technologies,<sup>159</sup> mitigate risks associated with payment or measurement of impressions,<sup>160</sup> create or improve types of digital ads,<sup>161</sup> and incorporate new ad tech features, including AI, to reduce costs and enhance the effectiveness of the way that customers interact with ad tech to make ad transactions.<sup>162</sup>

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interests.” (David Temkin, “Charting a course towards a more privacy-first web,” Ads & Commerce Blog, March 3, 2021, available at: <https://blog.google/products/ads-commerce/a-more-privacy-first-web/>). Additionally, Google employs “[b]uilt in protections against micro-targeting (list minimums, fewer audience categories).” (GOOG-AT-MDL-004299200, at -207). Other ad tech companies have taken similar approaches. For instance, “[b]eginning in 2021, Apple [required] opt-in from users for apps to use any user or device level data that is used for tracking.” (GOOG-AT-MDL-004299200, at -215). In internal documents, Google establishes that its “[m]easurement solutions must be: Trustworthy, Comparable across media and Actionable for optimization. While also being privacy-safe and representing Google fairly.” (GOOG-DOJ-27710710, at -733).

<sup>159</sup> For example, ad server AdPushup also provides publishers with an AdBlock Recovery feature. AdPushup’s “pro-user ad-reinsertion technology helps web publishers recover that revenue without disrupting the user experience of the website.” (Internet Archive, “AdBlock Recovery,” available at: <https://web.archive.org/web/20231208185511/https://www.adpushup.com/adblock-recovery/>. Accessed August 6, 2024). Additionally, in its Demand Side Platforms Report from 1H 2021, Advertiser Perceptions found that “Audience targeting capabilities” and “[a]bility to activate ... first-party data” were both listed as “Top Driver[s] of Retention.” (GOOG-DOJ-AT-02524665, at -710). In 2015, Google also saw a 20% reduction in its “[remarketing] Ad mute rate” by adopting filters on its Google Display Network. (GOOG-TEX-00221417, at -427).

<sup>160</sup> In response to concerns over price transparency in ad tech, in 2022, Google “introduced Confirming Gross Revenue, a tool that gives buyers and publishers the ability to verify for themselves that hidden fees haven’t been taken from digital advertising transactions when using Google Ad Manager.” Google even integrated this tool with third-party competitors such as Yahoo and Index Exchange to “shape this new solution in ways that work for others in the industry – improving trust in programmatic buying for everyone.” (Dan Taylor, “Building towards greater transparency in media buying,” Google Ads & Commerce Blog, June 8, 2023, available at: <https://blog.google/products/ads-commerce/building-towards-greater-transparency-in-media-buying/>). Google noted that “[s]ome publishers feel that Ad Manager does not offer them enough control and flexibility... In 2021, the product team hopes to introduce richer configuration tools and greater transparency around publisher interaction with bidders.” (GOOG-AT-MDL-004300215, at -223). Google has also innovated to keep accurate ads measurement at the forefront of its strategy by “develop[ing] 1P [(first-party)] & 3P [(third-party)] data measurement solution[s]” and “lead[ing] privacy safe measurement with cloud technology[.]” (GOOG-DOJ-27710710, at -727, -735).

<sup>161</sup> Google’s catalog of available ad formats regularly grows to suit its customers’ needs and incorporate new technology. They offer not only display, but also shopping, local, app, and Performance Max, which is driven by AI, among others. Even within the display umbrella, there are responsive, static, and dynamic ad formats, offering customers a breadth of options to choose from depending on their needs. (Sarbashree Mallik, “What are the new Innovative Ad Formats from Google?” AdSparc, September 3, 2021, available at: <https://adsparc.com/what-are-the-new-innovative-ad-formats-from-google/>; Dennis Buckley, “Types of Google Ads: Ad Formats, Campaign Types & Best Practices for 2022,” Demand Curve, available at: <https://www.demandcurve.com/blog/types-of-google-ads>. Accessed August 6, 2024).

<sup>162</sup> According to one observer, “Google recently climbed upon a completely new level of AI implementation in ad tech by introducing generative AI tools that can already replicate the work of professional marketing agencies... Google’s AI harnesses real-time data to meticulously adjust bids and targeting, enabling advertisers to achieve the highest possible return on their investments.” (Ivan Guzenko, “How Will AI-Powered Ads Reshape the Market?” Forbes, July 7, 2023, available at: <https://www.forbes.com/sites/forbestechcouncil/2023/07/07/intelligent-advertising-how-will-ai-powered-ads-reshape-the-market/>).

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172) In addition to investments in quality, documents indicate that ad tech companies, including Google, also use price concessions to attract customers.<sup>163</sup> To the extent that ad tech prices broadly appear stable, one cannot conclude that advertisers and publishers do not care about “prices” or that competition is lacking.<sup>164</sup> Advertisers and publishers care about their returns (i.e., what advertisers get in return for their ad spend and what publishers get in return for their ad space).<sup>165</sup> As discussed above, even if ad tech prices remain fixed, investments that improve or increase the value of impressions purchased at auction benefit advertisers and publishers in a manner similar to lowering prices. Like a price reduction, an increase in the quality of one platform provides incentives for rivals’ customers to

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<sup>163</sup> From the end of 2015 to Q1 of 2017, Google observed a downward trend in its revenue share of publisher gross revenue for private auction (PA), preferred deal (PD), and programmatic guaranteed (PG) transaction types. They attribute this to “increased discounts for PA/PD/PG which [they] expect[ed] to continue.” (GOOG-DOJ-05270444, at -453). Another Google document shows that PA/PD/PG experienced about 100 discounts total in 2017 and that “[r]oughly a third of both PA/PD [revenue] is already discounted.” (GOOG-DOJ-06877073, at -076, -090). In 2016, the Net Revenue Discount for AdX PA was 17 percent and for AdX PD/PG it was 14 percent. (GOOG-DOJ-06877073, at -123). Google documents also note that Magnite, Index Exchange, and OpenX “aggressively compete on price” and “continue to be stable players in the marketplace.” (GOOG-AT-MDL-004300215, at -221). Similarly, AppNexus/Xandr is noted in competitive overviews as a “low cost option” that is Google’s “primary full-stack competition.” (GOOG-AT-MDL-004300215, at -220-221). Internal Google guidelines also describe procedures for offering discounts to partners when negotiating contracts: “check...for discount options—work with your Platform POC to obtain approval for discount[.]” (GOOG-DOJ-AT-01128809, at -870). They also indicate negotiated tiered revenue share structures for 17 different publishers on AdX, with some reaching only a 15-percent revenue share. (GOOG-DOJ-05270444, at -454). Additionally, from 2015 to the middle of 2017, Google saw a “downward trend [in] buy-side platform fees] for Non-YouTube across all deal types/inventory sources, with largest decline on Preferred Deals and OA declining at increasing rate.” (GOOG-DOJ-AT-02643293, at -302). Likewise, in 2016, Google lost their partner Alma Media to AppNexus, and one of the main reasons listed for this loss was that “AppNexus proposed 8% for [Open Auction],” showing the impact pricing strategies can have on partner relationships. (GOOG-DOJ-09475820, at -844).

<sup>164</sup> Regardless of whether firms engage in nonprice competition, stable prices can also be consistent with competition.

<sup>165</sup>



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shift their business to the platform unless rivals sufficiently improve their quality as well.<sup>166</sup> This competition can be intense and disruptive.<sup>167</sup>

**5. *The Plethora of Options that Users Have for Viewing Content Heightens Competitive Pressure on Google's Ad Tech Products***

173) Google and other ad tech companies that match advertisers with user impressions on publishers' websites face competitive pressure across the entire digital ad space.<sup>168</sup> Users spend time viewing content on a variety of different platforms and formats—including publisher websites on the open web, behind paywalls, on social media, on mobile apps, on connected TV, and so on. Accordingly, advertisers can reach users in many places.

174) Suppose an ad tech firm ignored competitive constraints and unilaterally raised prices or lowered quality only for ad tech used to indirectly purchase display ads on the open web. This move would incentivize advertisers and publishers to substitute towards alternative ways of reaching users and monetizing content, respectively. With fewer customers to match for display ads on the open web, ads would be lower quality and fetch less at auction. Publishers would have less revenue to spend on content.

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<sup>166</sup> For example, when discussing lost partners that Google hopes to win back, only 44% of losses were attributed to pricing. The solution suggested for these losses related to “[r]ate-card clarity and ability to easily discount across full stack.” Additionally, Google lists other potential improvements such as “[p]rovid[ing] [a] clear account management and service offering for non-DFP partners” and “integrat[ing]... DFP in internal workflows.” Finally, Google also notes that “[p]ricing (discounts) does not seem to have been a major factor” in losses. (GOOG-DOJ-02839847, at -853-855).

<sup>167</sup> One industry commentator puts it this way: “[T]echnology providers will need to find ways to evolve their offerings... this will mean in many cases either a completely new approach, or a set of innovations in how technology is integrated with the first-party companies’ infrastructure. The great thing about disruption is that it leads to new innovations.” (Eric Picard, “The 6<sup>th</sup> Wave of Advertising Technology: Privacy,” AdExchanger, February 24, 2021, available at: <https://www.adexchanger.com/data-driven-thinking/apple-ios14-changes-your-app-may-no-longer-mean-your-data/>).

<sup>168</sup> For example, in an internal document Google notes that in 2015, Criteo’s “[t]ech improvements dr[ove] 20% improvements in client results from previous year” with “25% of revenue generated from consumers that have been matched cross device.” (GOOG-TEX-00221417, at -449).

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Users would respond to lower quality content on the open web by viewing more content on apps, social media, connected TV, and elsewhere.

175) The mere fact that users have options is itself a competitive constraint.<sup>169</sup> Even if advertisers and publishers were unable to substitute away from the open web, higher prices and lower quality for open web ad tech are unlikely to be sustainable if users can easily migrate to ecosystems offering better user experiences. This is because higher prices and inferior quality of ad tech translate into lower quality ad matches and ultimately reductions in publisher content on the open web. These adverse effects incentivize users to spend less time viewing content on the open web and more time viewing content in alternative digital spaces. For this reason, if users can readily substitute away from the open web ecosystem, a price increase or quality reduction on this narrow subset of ad tech is unlikely to be sustainably profitable.

176) Advertisers can reach their target users through a variety of digital channels. ComScore data show that advertisers reach the same users on a variety of digital platforms (e.g., Facebook, Instagram, Amazon, X (formerly Twitter), Walmart, Reddit, Etsy, and TikTok) that they can reach on traditional publisher websites (e.g., NYTimes.com, WSJ.com, Foxnews.com, CNN.com, and Weather.com). For example, Exhibit 9 shows cross-visitation between the top 25 news and entertainment publishers and digital platforms that Professor Gans excludes from his candidate relevant markets.<sup>170</sup> Exhibit 9

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<sup>169</sup> Advertisers and marketers keep a close eye on the behavior of users in order to “adapt and optimize their strategies to align with [the trajectory of media consumption]. ... As we forge ahead in the digital era, the influence of social media on marketing strategies will only continue to grow.” (Bob McKay, “TV Marketing’s Reign Is Over; Now Social Media Has Taken Its Place,” *Forbes*, December 1, 2023, available at: <https://www.forbes.com/sites/forbesagencycouncil/2023/12/01/tv-marketings-reign-is-over-now-social-media-has-taken-its-place/>).

<sup>170</sup> See also Figure 11.

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demonstrates significant cross-visitation patterns in April 2022. For example, of all visitors to NYTimes.com in April 2022, about 80 percent visited Amazon and about 80 percent visited Facebook. Across most news and entertainment sites in the data, Facebook is the most commonly cross-visited digital platform excluded from Plaintiffs' candidate relevant market.<sup>171</sup> More broadly, users have increasingly moved their attention away from platforms like traditional broadcast TV and towards sources like social media and apps, inducing advertisers to adjust their marketing strategies accordingly.<sup>172</sup>

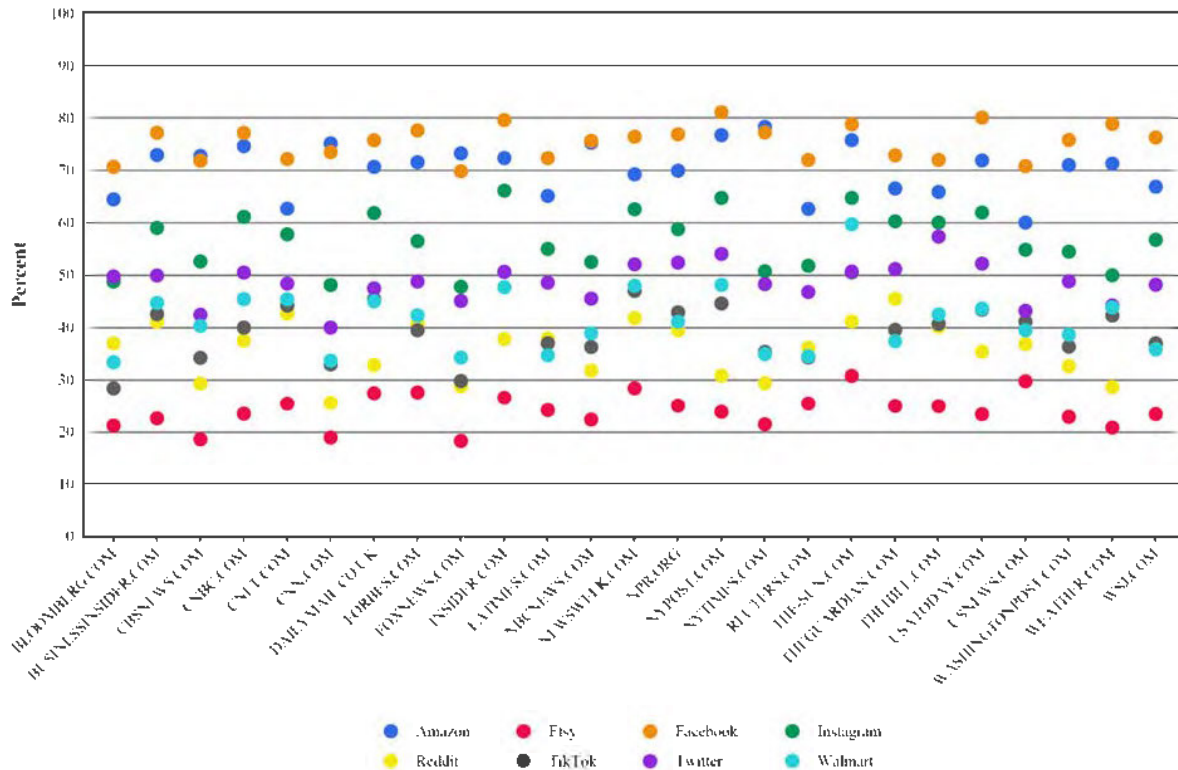
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<sup>171</sup> Figure 12 shows a detailed breakdown of the cross-visitation between all news site visitors and Facebook in April 2022.

<sup>172</sup> Bob McKay, "TV Marketing's Reign Is Over; Now Social Media Has Taken Its Place," *Forbes*, December 1, 2023, available at: <https://www.forbes.com/sites/forbesagencycouncil/2023/12/01/tv-marketings-reign-is-over-now-social-media-has-taken-its-place/>.

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**Exhibit 9**  
**Percentage of News Website Visitors Also Visiting Out of Market Websites**  
**April 2022**



Notes: This chart shows the percentage of all visitors to each website shown on the X axis that also visited out of market websites during April 2022.

Source: DOJ RFP 57 Comscore April 2022 Top25News SocMedAWE.

177) Data indicate that the time users spend on mobile and desktop browsers has declined substantially from 2009 to 2023 relative to the time they spend on mobile apps.<sup>173</sup> As these trends of

<sup>173</sup> See Figure 13.

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content consumption evolve, advertisers and publishers will continue to follow users, who currently spend only about 18 percent of their media consumption time on mobile and desktop browsers.<sup>174</sup>

178) Not only do advertisers shift their spending to follow users, the nature of ads (e.g., banner versus video) continually changes to keep up with the evolving preferences of users.<sup>175</sup> Exhibit 10 shows the substitution from traditional image-based ads to video, social media, and in-app ads designed to follow the evolution of preferences and technology for accessing digital content.<sup>176</sup> The viewing habits of users impact the return on ad spend (“ROAS”),<sup>177</sup> and competition over the price and quality of ad tech services impacts the incentives of advertisers to shift ad budgets across the different ways they can reach users to meet their advertising needs.

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<sup>174</sup> See Figure 13. Google documents note: “When it comes to format innovation we’re focused squarely on formats that are programmatic and mobile. Why? Because that’s where the users and the money is! Our business and that of our publishers is majority mobile and our priorities need to reflect that.” Additionally, one of Google’s main goals in 2016 was to “[l]ead the industry’s ongoing transition to mobile ads” by “[b]ecom[ing] the clear leader in [mobile web], [mobile apps], and mobile video ads for publishers.” (GOOG-TEX-00348289, at -523, -399).

<sup>175</sup> “The most relatable content is probably user-generated content, and it’s not surprising that 92% of the consumers rely on organic user-generated content, and prefer it to traditional advertising.” (Team Pepper, “The Rise of Video Content: A Brief Explainer,” available at: <https://www.peppercontent.io/blog/rise-of-video-content/>. Accessed August 6, 2024).

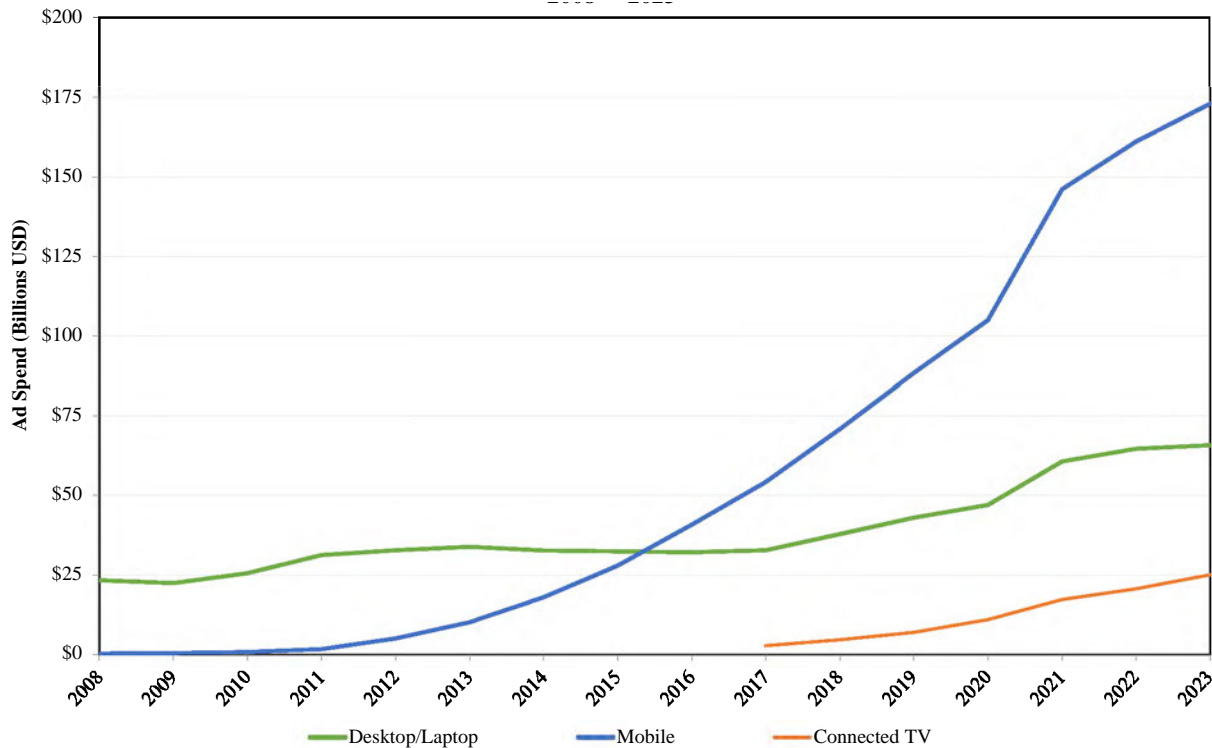
<sup>176</sup> See also Exhibit 1 and Figure 1.

<sup>177</sup> Some materials in this matter refer to return on investment (“ROI”) to describe advertisers’ approach to evaluating the effectiveness of their ad spend. I use ROAS and ROI interchangeably unless otherwise stated.



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**Exhibit 10**  
**U.S. Digital Ad Spending by Device Type**  
**2008 - 2023**



Notes: Data are estimates from eMarketer. Mobile ad spending includes spending for ads on tablet devices. Includes all forms of digital ads.

Source: DOJ RFP 57 eMarketer Data – “U.S. Ad Spending 2023.”

## **6. Competition Among Ad Tech Companies Evolves Rapidly**

179) The ad tech industry is and has been rapidly changing, necessitating the rapid adaptation of all tools that serve the needs of advertisers and publishers. According to Forbes, “AdTech is not merely a facilitator but a dynamic force reshaping the advertising landscape.”<sup>178</sup> As the behavior of users

<sup>178</sup> Kalina Bryant, “How AdTech is Transforming Digital Advertising and Driving Impact,” Forbes, January 10, 2024, available at: <https://www.forbes.com/sites/kalinabryant/2024/01/10/how-ad-tech-is-transforming-digital-advertising-and-driving-impact/>.

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evolves, ad tech firms are forced to reposition themselves, invest in quality, and innovative features. Ultimately, it is customer preferences that drive investments, updates, and new features.<sup>179</sup>

180) Ad exchanges are the product of evolution in the ad tech space and have already been susceptible to further evolution in the way publishers and advertisers buy and sell ads.<sup>180</sup> In the early 2000s, before the advent of exchanges, ad networks ruled the landscape and were responsible for aggregating supply from multiple publishers and selling it to willing buyers.<sup>181</sup> But as the internet and the scale of publishers evolved, so too did the needs of buyers and sellers.<sup>182</sup> Rather than relying on a non-programmatic network to manually compile and sell publishers' supply, "the marketplace reacted by introducing ad exchanges and real-time bidding (RTB) in 2007,"<sup>183</sup> intensifying competitive pressure on ad networks.<sup>184</sup>

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<sup>179</sup> For example, in 2017, Google listed its DVAA Strategy Principle as "[i]mprov[ing] ad experiences for users" by "[t]urn[ing] the tide on negative consumer sentiment towards digital ads by aspiring delightful, relevant ad experiences for users, resulting in better ROI for advertisers and monetization for publishers." (GOOG-TEX-00348289, at -399).

<sup>180</sup> Digiday, "A History of Ad Tech Chapter 2: The Ad Net's Golden Age," December 11, 2023, available at: <https://digiday.com/media-buying/a-history-of-ad-tech-chapter-2-the-ad-nets-golden-age/>. ("The emergence of the ad exchange ... is regarded as revolutionary by most seasoned industry observers."); Emodo, "What Is An Ad Exchange And How Does It Work?" July 14, 2023, available at: <https://www.emodoinc.com/blog/what-is-an-ad-exchange/>. ("Ad exchanges are evolving to meet the changing needs of the online advertising industry, with new trends and technologies shaping their future." Common changes concern "[p]rivacy regulations," "[h]eader bidding," and "[a]rtificial intelligence and machine learning.").

<sup>181</sup> Digiday, "A History of Ad Tech Chapter 2: The Ad Net's Golden Age," December 11, 2023, available at: <https://digiday.com/media-buying/a-history-of-ad-tech-chapter-2-the-ad-nets-golden-age/>. ("[T]he early 2000s was the prime era for selling online media space via ad networks.").

<sup>182</sup> Clearcode, "The History of Digital Advertising Technology," available at: <https://adtechbook.clearcode.cc/history-advertising-technology/>. Accessed July 17, 2024 ("[A]d exchanges emerged to solve the many technical nuisances found in ad networks, such as multiple redirects, and allowed advertisers to purchase inventory on an impression-by-impression basis.").

<sup>183</sup> MIT Technology Review Insights, "The Evolution of Ad Tech," September 5, 2013, available at: <https://www.technologyreview.com/2013/09/05/113056/the-evolution-of-ad-tech/>.

<sup>184</sup> See, e.g., Digiday, "A History of Ad Tech Chapter 2: The Ad Net's Golden Age," December 11, 2023, available at: <https://digiday.com/media-buying/a-history-of-ad-tech-chapter-2-the-ad-nets-golden-age/>. ("[T]he emergence of ad exchanges meant buyers and sellers, i.e. the companies that had formerly been blissfully unaware of the vast margins ad networks made, could eventually take more control").

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181) This evolution in ad tech is ongoing. As programmatic ad tech options developed, advertisers and publishers began implementing so-called “supply-path optimization” which led to some ad tech firms losing connections to customers.<sup>185</sup> Advertisers are now “pushing for more direct connections to publisher supply, less reselling of inventory, fewer redundant auctions and more transparency from programmatic partners.”<sup>186</sup>

182) In short, ad tech companies are continually repositioning and constantly evolving. Incumbent ad tech companies compete not only with existing firms, but also evolve in response to threats from businesses that are well-placed for repositioning,<sup>187</sup> the potential of customers to develop in-house solutions,<sup>188</sup> and potential entry by new start-ups.<sup>189</sup> Today, multiple companies provide ad tech tools

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<sup>185</sup> Anthony Vargas, “AdExplainer: What Is Supply-Path Optimization (SPO)?” AdExchanger, April 25, 2022, available at: <https://www.adexchanger.com/adexplainer/adexplainer-what-is-supply-path-optimization-spo/>. (“Buyers often hop over their DSP and reach out directly to SSPs to negotiate SPO deals: ‘What we’re hearing from buyers is that they want to work more deeply with fewer partners,’ said Magnite CRO Sean Buckley.”).

<sup>186</sup> Anthony Vargas, “Yahoo Shuttering its SSP is Evidence that Ad Exchanges are Becoming Interchangeable,” AdExchanger, February 15, 2023, available at: <https://www.adexchanger.com/platforms/yahoo-shuttering-its-ssp-is-evidence-that-ad-exchanges-are-becoming-interchangeable/>.

<sup>187</sup> In 2017, Nasdaq introduced MYIAX, an ad exchange designed to leverage the substantial financial data controlled by Nasdaq. (Nasdaq, “Announcing NYIAX, the World’s First Advertising Contract Exchange,” March 14, 2017, available at: <https://ir.nasdaq.com/news-releases/news-release-details/announcing-nyiax-worlds-first-advertising-contract-exchange/>).

<sup>188</sup> For example, Amazon, Facebook, Disney, [REDACTED]. For example, Disney’s proprietary ad server “gives the company greater flexibility and control, in order to prioritize delivery behavior for ad clients and its own business.” (Todd Spangler, “Why Disney Built Its Own Ad Server for Disney+ and Hulu – and What the YODA Does,” Variety, January 22, 2023, available at: <https://variety.com/2023/digital/news/disney-ad-server-tech-disney-plus-yoda-1235497663/>.) See also Amazon, “Ad tech solutions,” available at: <https://advertising.amazon.com/adtech-solutions>. Accessed April 26, 2024; Meta, “Move your business forward with Meta technologies,” available at: <https://business.meta.com/>. Accessed April 26, 2024; Disney Advertising, “Disney is where Technology, Imagination and Innovation Collide,” available at: <https://www.disneyadvertising.com/technology-innovation/>. Accessed April 26, 2024; Walmart, “Walmart Announces Expanded Vision and New Name for its Media Business,” January 28, 2021, available at: <https://corporate.walmart.com/news/2021/01/28/walmart-announces-expanded-vision-and-new-name-for-its-media-business>.

<sup>189</sup> [REDACTED]

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that can be used for desktop web, mobile web, and in-app ads.<sup>190</sup> The interchangeability of these formats puts companies that are already well established in providing web (both mobile and desktop) and in-app tools in a position to potentially launch adjacent ad tech tools.<sup>191</sup> Multi-sided markets evolve quickly, and current leaders often face considerable competition from potential entrants and other platforms (including those operating in adjacent markets) striving to replace current leaders.<sup>192</sup>

**VI. PROFESSOR GANS FAILS TO DEFINE AN APPROPRIATE RELEVANT MARKET**

183) The primary purpose of defining a relevant market is to identify the products and services at issue and their key sources of competitive constraint in order to assess whether those constraints are sufficient to prevent the exercise of monopoly power.<sup>193</sup> A properly defined relevant market specifies the product and geographic area in which the competitive concern arises.<sup>194</sup> A relevant market must be

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<sup>190</sup> This includes tools for publishers, like Microsoft Xandr's Monetize SSP and Magnite's SSP, as well as tools for advertisers, like The Trade Desk and Criteo. (Microsoft Advertising, "Microsoft Monetize SSP," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/publisher-platforms-scaled-buying-selling-solutions>. Accessed July 16, 2024; Magnite, "Guiding buyers: Through the omnichannel media selection box," September 19, 2023, available at: <https://www.magnite.com/blog/guiding-buyers-through-the-omnichannel-media-selection-box/>; The Trade Desk, "Four benefits of omnichannel advertising that you might be missing out on," June 7, 2022, available at: <https://www.thetradedesk.com/us/resource-desk/four-benefits-of-omnichannel-advertising-that-you-might-be-missing-out-on>; Criteo, "Transform more customers into active shoppers," available at: <https://www.criteo.com/products/criteo-audience-match/>).

<sup>191</sup> For example, Apple operates the top mobile browser, the second most-used desktop browser and second largest app store. Additionally, Apple offers ad tech for mobile app ads and could launch a tool that provides ad tech for web publishers. (Apple, "Ads on Apple News: Getting Started with Workbench," June 2021, available at: <https://developer.apple.com/apple-news/Workbench-Getting-Started-for-Publishers.pdf>; Statista, "Market share held by leading mobile internet browsers in the United States from January 2015 to February 2024," available at: <https://www.statista.com/statistics/272664/market-share-held-by-mobile-browsers-in-the-us/>. Accessed August 6, 2024; Stetic, "Browser Statistics – March 2024," available at: <https://www.stetic.com/market-share/browser/>. Accessed March 7, 2024; Statista, "Number of apps available in leading app stores as of 3rd quarter 2022," available at: <https://www.statista.com/statistics/276623/number-of-apps-available-in-leading-app-stores/>. Accessed August 6, 2024).

<sup>192</sup> See, e.g., David S. Evans, "The Antitrust Economics of Multi-Sided Platform Markets," *Yale Journal on Regulation*, Vol. 20, 2003, pp. 325-381, at p. 360 ("Because many of the two-sided markets are fast moving, current leaders often face competition in the form of potential entrants—other platforms striving to displace today's leader.").

<sup>193</sup> "A meaningful relevant market must be conditioned on a specific theory of anticompetitive harm; otherwise, the relevant market cannot properly inform the analysis of competitive effects." (David Glasner and Sean P. Sullivan, "The Logic of Market Definition," *Antitrust Law Journal*, Vol. 83, No. 2, 2020, pp. 293-345, at p. 316).

<sup>194</sup> See Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at pp. 39-40 and Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, 2010, at p. 7. And, as outlined by the U.S. Ninth Circuit in *Spectrum Sports*,

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sufficiently broad to include all products and firms that constrain competition with respect to the product that is the subject of the alleged conduct.

184) The relevant market for analyzing the antitrust claims in this case is a multi-sided transactions platform market, in which an advertiser's ad is matched to publisher inventory and displayed to a user. Professor Gans applies a flawed and unreliable analysis to define four artificially narrow relevant markets in this matter: publisher ad servers used for the sale of open web display impressions, ad exchanges for transacting indirect open web display impressions, ad buying tools for small advertisers for buying open web display impressions, and ad buying tools for large advertisers for buying open web display impressions.<sup>195</sup> In particular, Professor Gans' assessment ignores market realities—including indirect network effects exhibited by ad tech platforms, integration of components of the ad tech stack (which is distinct from indirect network effects), and publisher and advertiser multi-homing and substitution between ad types “inside” and “outside” of each candidate market—all of which indicate that the markets Professor Gans defines are improperly narrow.<sup>196</sup>

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Inc. v. McQuillan, 506 U.S. 447 (1993), to “[demonstrate] the dangerous probability of monopolization in an attempt case also requires inquiry into the relevant product and geographic market and the defendant's economic power in that market.” (Spectrum Sports, Inc. v. McQuillan, 506 U.S. 447, 459 (1993)).

<sup>195</sup> “Generally, it is not possible to examine price effects on one side of a market without considering the effect on the other side and the feedback effects between them ... Ignoring interdependencies between the two sides is a common mistake in the antitrust analysis of two-sided markets. For example, this mistake was made in the analysis of class certification issues in *Visa Check/MasterMoney*. ... The plaintiffs' expert claimed that it was possible to change a significant price on one side of the market (debit-card interchange fees) without any other changes in the two-sided market.” (David S. Evans, et al., *Platform Economics: Essays on Multi-Sided Businesses*, Competition Policy International, 2011, at p. 115).

<sup>196</sup> “The application of a one-sided SSNIP test in cases involving two-sided platforms can result in a ‘relevant market’ that includes just one side of a two-sided platform, even though that other side imposes significant constraints that would temper a price increase. It would place key aspects of profit maximization and strategic interactions outside the ‘relevant market.’ ‘[T]he market would be drawn too narrowly and estimates of market concentration too high, because the standard approach fails to consider the tempering effects on price coming from the other side.’” (David S. Evans, et al., *Platform Economics: Essays on Multi-Sided Businesses*, Competition Policy International, 2011, at p. 149).

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**A. Economic Principles Applicable to Defining a Relevant Antitrust Market**

185) To evaluate the relevant antitrust market for a product, economists typically assess the alternatives customers would turn to in response to an increase in price or reduction in quality for the product that is the target of an antitrust inquiry.<sup>197</sup> In the present matter, advertisers use ad tech to reach users and publishers use ad tech to monetize content, so these alternatives include alternative ways for advertisers to reach the targets of their ads and alternative ways for publishers to monetize content. The products in a relevant antitrust market must include those that constrain the prices or qualities that the target of an antitrust investigation is able to set.<sup>198</sup> This is typically done by considering the set of products that customers view as reasonably interchangeable—or in economic terms, the set of products different customers view as substitutes.<sup>199</sup> The economic rationale for this focus on substitutes is that, if one or more customers have reasonable alternatives, attempts to exercise monopoly power by raising

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<sup>197</sup> Substitutes are merely means that serve the end goal of identifying economic constraints on the ability to profit from monopoly power. Substitutes are an economic mechanism through which firms learn that the penalty the market imposes on firms that attempt to earn profits above competitive levels—through price increases or quality reductions—is lost sales. However, substitutes are not the only way in which a market penalizes the attempt to raise prices. Some customers, rather than turning to an alternative, will leave the market in response to a price increase. That is, the outside options of customers can constrain the exercise of monopoly power. Customers with highly elastic demand may cease purchases of a product when faced with a price increase. Thus, substitutes constrain the ability to exercise monopoly power because they offer direct insight into the friction that works against firms' pursuits of greater profits. See Dennis W. Carlton, "Does Antitrust Need to be Modernized?" *Journal of Economic Perspectives*, Vol. 21, No. 3, 2007, at p. 161 ("A loose economic definition of a *market* is that it comprises all those products whose presence constrains the price of a particular product to a particular level.").

<sup>198</sup> Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, Edition 4, Pearson, 2005, at p. 646 ("A proper definition of the product dimension of a market should include all those products that are close demand or supply substitutes.").

<sup>199</sup> As Jonathan B. Baker, former Director of the Bureau of Economics at FTC, has stated: "[t]here should be little controversy about the *Brown Shoe* practical indicia to the extent they are used as proxies for demand and supply substitutability." (Jonathan B. Baker, "Stepping Out in an Old *Brown Shoe*: In Qualified Praise of Submarkets," *Antitrust Law Journal*, Vol. 68, No. 1, 2000, pp. 203-218, at p. 207). Pleatsikas and Teece note that "... *Brown Shoe* is still utilized from time to time, despite the fact that economic analysis and agency thinking has long eclipsed it ... [*Brown Shoe*] indicia for identifying markets ... and for assessing market power within those markets ... are particularly ill-suited to analyzing high technology markets." (Christopher Pleatsikas and David Teece, "The analysis of market definition and market power in the context of rapid innovation," *International Journal of Industrial Organization*, Vol. 19, No. 5, 2001, pp. 665-693, at pp. 672-673).

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prices or reducing quality would not be profitable if enough of these customers' purchases were diverted to other products.<sup>200</sup>

***1. The Hypothetical Monopolist Test***

186) Economists operationalize the key question of interchangeability or substitution by conducting the so-called "Hypothetical Monopolist Test" (HMT).<sup>201</sup> If a hypothetical monopolist of a candidate market cannot profitably increase price because it would lose enough sales due to substitution to products excluded from the markets to render the price increase unprofitable, individual firms (either unilaterally or collectively) also could not exercise monopoly power in that market. Such a candidate market would not be a relevant market for antitrust purposes.

187) More formally, a relevant product market consists of a set of products such that:

"a hypothetical profit-maximizing firm, not prevented by regulation from worsening terms, that was the only present and future seller of a group of products ('hypothetical monopolist') likely would undertake at least a small but significant and non-transitory

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<sup>200</sup> Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at p. 46 ("Market definition focuses solely on demand substitution factors, that is, on customers' ability and willingness to substitute away from one product or location to another in response to a price increase or other worsening of terms. Supplier responses may be considered in the analysis of competition between firms..., entry and repositioning..., and in calculating market shares and concentration."); Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, 2010, at p. 7 ("Market definition focuses solely on demand substitution factors, i.e., on customers' ability and willingness to substitute away from one product to another in response to a price increase or a corresponding non-price change such as a reduction in product quality or service. The responsive actions of suppliers are also important in competitive analysis. They are considered in these Guidelines in the sections addressing the identification of market participants, the measurement of market shares, the analysis of competitive effects, and entry."); Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, Edition 4, Pearson, 2005, at p. 646 ("[A] market should include all those products that are close demand or supply substitutes.").

<sup>201</sup> Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at pp. 41-42; Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, 2010, at pp. 8-10. Among other things, this test ensures that the boundaries of a candidate antitrust market account for relevant factors that constrain the exercise of monopoly power along the product dimension (i.e., across products) and the geographic dimension (i.e., across geographies). The *Horizontal Merger Guidelines* and various updates discuss relevant market definition and have been frequently cited by courts, policy makers, and economists, among others. See Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at pp. 39-48; Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, 2010, at pp. 8-15.



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increase in price ('SSNIP') or other worsening of terms ('SSNIPT') for at least one product in the group."<sup>202</sup>

188) Similarly, relevant geographic market is the geographic region in which:

“a hypothetical profit-maximizing firm that was the only present or future supplier of the relevant product(s) at supplier locations in the region likely would undertake at least a SSNIPT in at least one location [when] the terms of sale for products sold to all customers at facilities outside the region are ... held constant.”<sup>203</sup>

189) Notice that the relevant market is agnostic to whether the products “inside” the relevant market are complete functional substitutes, and does not require that all customers have substitutes.<sup>204</sup> As a matter of economics, two products are economic substitutes if an increase in the price of one product results in an increase in the demand for the other product.<sup>205</sup> While functional or technological substitutes may well be economic substitutes for a product, a SSNIP<sup>206</sup> may also result in significant diversion to products that are not functional or technological substitutes; that is, the economic substitutes that customers turn to might look dissimilar to the product on which the SSNIP is imposed.<sup>207</sup> Even if some

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<sup>202</sup> Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at pp. 41-42. See Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, 2010, at p. 9 (“A hypothetical profit-maximizing firm, not subject to price regulation, that was the only present and future seller of those products (“hypothetical monopolist”) likely would impose at least a small but significant and non-transitory increase in price (“SSNIP”) on at least one product in the market, including at least one product sold by one of the merging firms.”).

<sup>203</sup> Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at p. 45. See Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, 2010, at p. 13 (“A hypothetical profit-maximizing firm that was the only present or future producer of the relevant product(s) located in the region would impose at least a SSNIP from at least one location [when] the terms of sale for all products produced elsewhere are held constant.”).

<sup>204</sup> Note that the degree of substitution among products inside the candidate relevant market (which is assumed to be controlled by a hypothetical monopolist) focuses on the wrong question. The appropriate question is whether a small but significant number of customers can substitute towards products or divert activity to services outside of the candidate relevant market to defeat the profitability of a price increase.

<sup>205</sup> Michael R. Baye and Jefferey Prince, *Managerial Economics and Business Strategy*, Edition 10, McGraw Hill, 2022, at p. 44.

<sup>206</sup> As a matter of convention, I use SSNIP to refer to a small but significant, non-transitory increase in quality adjusted price, which accounts for a “worsening of terms” as described in the Department of Justice & Federal Trade Commission Merger Guidelines.

<sup>207</sup> For example, a SSNIP imposed by a hypothetical monopolist of lawn care services in Plano, TX might be unprofitable because it is constrained by the fact that a small but significant number of Plano property owners would respond to the higher price by replacing grass lawns with rock gardens.



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options are not attractive substitutes for some customers, if a sufficient number of customers have at least one attractive substitute, a SSNIP may be unprofitable because of the aggregate volumes lost to these different “outside” products.

190) Three aspects of the HMT warrant further exposition. First, the SSNIP is a “small but significant” change in price. The actual amount and mechanism by which it is implemented are context- and case-specific.<sup>208</sup>

191) Second, the HMT requires that the SSNIP be profitable. In many instances, only a modest degree of substitution or diversion is necessary to render the SSNIP unprofitable. For example, when marginal costs are negligible (as may be the case in transaction platform markets with high fixed costs), a 5 percent price increase is not profitable if it reduces sales by roughly 5 percent or more.<sup>209</sup> This implies that even in situations where the majority of customers might not substitute, to define a relevant market for antitrust purposes, it may be necessary to expand the “candidate” market to include products that a minority of customers would substitute to in response to a SSNIP.<sup>210</sup>

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<sup>208</sup> Typically, a SSNIP is taken to be a 5 percent increase. (Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at p. 43; Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, 2010, at pp. 9-10).

<sup>209</sup> If a price ( $p$ ) increases 5 percent (to  $1.05p$ ) and sales ( $s$ ) decrease by  $x$  percent (to  $[1-x]*s$ ), where  $x \geq 0.05$ , total revenue decreases from  $p*s$  to  $1.05p * [1-x]*s$ . For example, if  $x=0.05$ , total revenue decreases from  $p*s$  to  $0.9975s$ . If marginal costs are near zero, this decrease in revenue corresponds to a decrease in profits. Intuitively, when a 5-percent price increase reduces sales by more than 5 percent of revenues, total revenues decline (and hence, profits also decline when marginal cost is negligible). In multi-sided markets, this type of critical loss analysis must recognize that there are additional losses because lost sales on one side results in additional losses on other groups due to network effects. See David S. Evans and Michael Noel, “Defining Antitrust Markets when Firms Operate Two-Side Platforms,” *Columbia Business Law Review*, Vol. 2005, No. 3, 2005, pp. 667-701, at pp. 699-700.

<sup>210</sup> For example, suppose products A, B, C, D, E, and F are “outside” of the “candidate” relevant market and that customers accounting for 94 percent of sales “inside” the candidate market would continue to purchase the “candidate” product if a SSNIP were imposed. Suppose that one percent of sales “inside” the candidate market are to customers who could only substitute to product A to defeat a SSNIP, another one percent of sales are to customers who could only substitute to product B, and so on. Even though the total substitution out of the candidate market amounts to only 6 percent of sales “inside” the candidate market, these lost sales more than offset the 5-percent-higher price the hypothetical monopolist charges the 94 percent of customers who are unable or unwilling to divert sales

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192) Third, the SSNIP must be “non-transitory.” This means that the hypothetical monopolist must be able to profitably sustain the price increase in the long run as customers have time to respond to the SSNIP by identifying and switching some of their business to substitutes.<sup>211</sup>

**2. Market Definition Principles in a Multi-Sided Market**

193) Defining relevant markets is more complex in multi-sided transaction markets such as credit cards and ride sharing—and ad tech. A hypothetical monopolist that operates in a candidate multi-sided market will generally find it optimal to charge different prices to each customer group,<sup>212</sup> and an increase in the price to any one group may adversely impact participation by members of other groups (due to indirect network effects). The effects of one group’s ability to substitute or switch can be amplified across groups because of indirect network effects: in multi-sided transaction markets like credit cards, ride sharing,<sup>213</sup> and ad tech, substitution by one group leads to reductions in usage by other groups.<sup>214</sup> A

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“outside” of the candidate market. In this case the HMT fails because the SSNIP is unprofitable; the “candidate” relevant market is too narrow and must be expanded to include at least one of the products A, B, C, D, E, and F. Thus, even when 94 percent of sales in the “candidate” market are to customers who have no substitutes for the “candidate” product, and “outside” products are such poor substitutes for a majority of customers that they can attract only one percent of sales in the “candidate” market, it is wrong as a matter of economics to conclude that the “candidate” market is a valid relevant product market. It is also important to examine whether the diversion required to make the SSNIP unprofitable can plausibly be absorbed by “outside” products.

<sup>211</sup> For example, it can take customers time and effort to identify and substitute to products “outside” of the candidate market. Or it might take time for new firms or businesses operating “outside” of the candidate product and/or geographic market to enter or reposition their products in response to the higher price inside the candidate market. When the threat of entry or repositioning would ultimately trigger competition that reduces the hypothetical monopolist’s profits from a SSNIP, the price increase is not sustainable; the relevant market must be expanded to include these constraints on the hypothetical monopolist’s ability to sustain a profitable SSNIP. In my experience, this is an important consideration in industries where technologies and the competitive landscape are dynamic and evolving.

<sup>212</sup> For instance, it is common for one side of a two-sided platform to be charged less than marginal cost to encourage participation on that side, in order to make it attractive for the other side, which is charged above marginal cost, also to participate. *See* Mark Rysman, “The Economics of Two-Sided Markets,” *Journal of Economic Perspectives*, Vol. 23, No. 3, 2009, pp. 125-143, at p. 130 (“Such seeming anomalies as price below marginal cost or even negative prices can easily arise in a two-sided market. For example, a platform might charge a price below cost on one side if those agents have a large price elasticity and their participation attracts a large number of participants on the other side who are relatively price inelastic.”).

<sup>213</sup> Liran Einav, Chiara Farronato and Jonathan Levin, “Peer-to-Peer Markets,” *Annual Review of Economics*, Vol. 8, 2016, pp. 1-31.

<sup>214</sup> This is also called the multiplier effect. *See, e.g.,* David S. Evans and Michael Noel, “Defining Antitrust Markets when Firms Operate Two-Side Platforms,” *Columbia Business Law Review*, Vol. 2005, No. 3, 2005, pp. 667-701, at p. 700.

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properly defined relevant market for a multi-sided platform evaluates whether it is profitable for a hypothetical monopolist to impose a SSNIP by considering its impact on the platform's overall ecosystem (accounting for all indirect network effects).<sup>215</sup>

194) Since the amount of business conducted on a transactions platform depends on all prices charged to different customer groups—and the product the platform produces is transactions—the full set of prices charged by the hypothetical monopolist impacts the profitability of a SSNIP in a multi-sided market.<sup>216</sup> For example, suppose a transaction platform serves a group of buyers (B) and sellers (S) and charges Group S \$0.90 per transaction and Group B \$0.10 per transaction. Then one possible SSNIP entails increasing Group S's per transaction fee by \$0.05 while leaving Group B's fee unchanged—or vice versa. Either of these SSNIPs raise the “price” (or total amount customers pay per transaction) from \$1.00 to \$1.05.<sup>217</sup> However, while both of these SSNIPs raise the “price” of a transaction by the same

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<sup>215</sup> “The economics of multi-sided markets differs from the economics of single-sided markets in important respects. First, the individual prices charged on each side of the market do not track costs or demand on that side of the market. The fact that benefits and costs arise jointly in multiple sides of the market implies that there is no meaningful economic relationship between benefits and costs on each side of the market considered alone. Second, one cannot talk about the individual prices in isolation. Any change in demand or cost on one side of the market will necessarily affect the level and relationship of prices on all sides. Third, products in multi-sided markets may not be able to come into existence unless firms in those markets get all sides on board. This gives rise to pricing and investment strategies that differ from those taken in one-sided markets and seem odd unless considered in the context of multi-sided market competition. Fourth, any analysis of social welfare must account for the pricing level, the pricing structure, and the feasible alternatives for getting all sides on board. It must also account for the possible role of not-for-profit institutions such as standards setting bodies and cooperatives.” (David S. Evans, “The Antitrust Economics of Multi-Sided Platform Markets,” *Yale Journal on Regulation*, Vol. 20, 2003, pp. 327-381, at pp. 355-356).

<sup>216</sup> An article on the antitrust case against the credit card platform Amex agrees: “A rigorous economic analysis of the NDPs’ competitive effects would have been two-sided, accounting for both the effects on network services to merchants and the effects on credit-card services to cardholders. The total price charged on both sides of the market is what drives output in the general purpose credit-card industry. This insight required the district court to balance the welfare gains on the cardholder side of the market against possible welfare losses on the merchant side of the market, so as to determine the net effect of the NDPs. Hence, the Second Circuit was correct as a matter of economic analysis to require the government to examine the competitive effects that the NDPs had on both sides of the platform and show that Amex’s consumers were ‘worse off overall.’” (J. Gregory Sidak and Robert D. Willig, “Two-sided market definition and competitive effects for credit cards after *United States v. American Express*,” *Criterion Journal on Innovation*, Vol. 1, 2016, pp. 1301-1311, at p. 1309).

<sup>217</sup> It follows from the same logic that combinations of price changes to the different groups that do not increase the total transaction price are not valid SSNIPs for conducting an HMT in a multi-sided transaction market. For example, one can rule out SSNIPs in which one side’s price increases and one side’s price decreases, such that the overall transaction price does not change by a SSNIP.

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amount (\$0.05 or 5 percent of the original price per transaction of \$1.00), these two different SSNIPs will generally have different effects on the total number of transactions (and hence the profitability of the SSNIP) because they may asymmetrically impact the participation incentives of Group B and Group S.<sup>218</sup>

195) The feedback effect in ad tech is also tied to the responses of users because their choices regarding where to consume content directly impact platform revenues. That is, substitution by users can reduce advertisers' and publishers' use of ad tech tools as publishers and advertisers only pay for ad tech when an ad is viewed or clicked. For instance, increases in ad tech prices that squeeze publishers and result in a lower incentive to develop valuable content may induce users to substitute towards viewing content in apps or social media, thereby reducing the utilization of ad tech inside Plaintiffs' candidate markets. For this reason, the market power of a multi-sided platform is constrained by substitution of advertisers, publishers, and users.

### ***3. Market Definition Principles in an Integrated Supply Chain***

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<sup>218</sup> As described in economics literature, businesses operating multi-sided platforms "always have to consider how changing prices on one side of the market will impact the other side of the market." (David S. Evans, "Antitrust Economics of Two-Sided Markets," in *Platform Economics: Essays on Multi-Sided Businesses*, ed. David S. Evans, 2011, at p. 105).

In some economic models (e.g., Rochet and Tirole), different formulations of the SSNIP (e.g., raising price to side A or side B) may give you the same answer; in others (e.g., my work with John Morgan), such neutrality fails. (See Jean-Charles Rochet and Jean Tirole, "Platform Competition in Two-Sided Markets," *Journal of the European Economic Association*, Vol. 1, No. 4, 2003, pp. 990-1029; Michael Baye and John Morgan, "Information Gatekeepers on the Internet and the Competitiveness of Homogeneous Product Markets," *American Economic Review*, Vol. 91, No. 3, 2001, pp. 454-474). The Rochet and Tirole model is not an appropriate model for ad tech because it ignores important indirect network effects between advertisers and publishers: "The assumption of multiplicative demand between the two sides [in the Rochet and Tirole model] understates the importance of the indirect network effects. It ignores the fact that the value each side obtains from the other side increases with the number of customers on the other side." (David S. Evans, "Antitrust Economics of Two-Sided Markets," in *Platform Economics: Essays on Multi-Sided Businesses*, ed. David S. Evans, 2011, at p. 103). See also "Michael R. Baye and John Morgan, "Pricing on the Internet," in *The New Palgrave Dictionary of Economics Online*, Palgrave Macmillan, 2013, at pp. 2-3. More broadly, when some groups (e.g. users who view ads) do not pay a pecuniary price but others (e.g., advertisers and publishers) pay pecuniary prices, strict neutrality will generally fail.

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196) The HMT applied to an integrated versus non-integrated set of firms will arrive at different results because the opportunity cost of lost sales from a SSNIP is larger for an integrated than a non-integrated firm. Each unit of lost demand for a given distinct product costs the non-integrated hypothetical monopolist P. A hypothetical monopolist that controls integrated businesses<sup>219</sup> loses P+B for each lost unit, where B is the gross profit on the sales of its other products in the supply chain. Hence, the losses of the integrated hypothetical monopolist are greater than the losses of the non-integrated monopolist. Thus, for any SSNIP, the hypothetical integrated monopolist loses more than a non-integrated monopolist, meaning that the product market will be drawn too narrowly if one does not account for vertical integration.

197) In evaluating the overall profitability of raising the price of ad servers, a hypothetical integrated monopolist over ad servers would account for lost sales in both the server and ad exchange lines of business. The latter (i.e., lost sales in the ad ex exchange market) would be ignored by a hypothetical non-integrated monopolist of ad servers. Importantly, this effect is in addition to incentive effects stemming from indirect network effects that arise even in the absence of integration. Even if one ignored indirect network effects and accepted Professor Gans' one-sided framework for market definition (which would be erroneous), ad servers, ad buying tools, and ad exchanges are components of

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<sup>219</sup> The *Guidelines* refer to an integrated hypothetical monopolist as a "hypothetical profit-maximizing cartel" of firms. Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at p. 42, fn. 82 ("If the pricing incentives of the firms supplying the products in the group differ substantially from those of the hypothetical monopolist, for reasons other than the latter's control over a larger group of substitutes, the Agencies may instead employ the concept of a hypothetical profit-maximizing cartel comprised of the firms (with all their products) that sell the products in the candidate market. This approach is most likely to be appropriate if the merging firms sell products outside the candidate market that significantly affect their pricing incentives for products in the candidate market. This could occur, for example, if the candidate market is one for durable equipment and the firms selling that equipment derive substantial net revenues from selling spare parts and service for that equipment."); See also Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, 2010, at p. 9, fn. 4.

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an integrated supply chain such that an increase in the price of any one component results in a decrease in demand for other components.<sup>220</sup>

198) Candidate markets that focus on a single component of an integrated supply chain are likely to conclude that a SSNIP is profitable when, in fact, it is not. For an integrated hypothetical monopolist, the impact of its decisions on one component may be constrained by adverse effects on sales of other components of its integrated supply chain. For example, suppose a hypothetical monopolist has integrated the ownership of ad buying tools and selling tools. In this case, the economic consequence of a SSNIP on buying tools is not only reduced spend by advertisers (due to substitution away from the buying tool itself), but also reduced fees (and hence profits) on the ad tech components that publishers use because there are fewer impressions bought by advertisers. Consequently, even if an unintegrated hypothetical monopoly supplier of buying tools could profitably impose a SSNIP, an integrated hypothetical monopolist that provides buying tools and selling tools may find a SSNIP on buying tools to be unprofitable (because of the accompanying lost profits on selling tools.)

***4. Market Definition Principles in Settings with Derived Demand (i.e., “Input” Markets)***

199) Defining relevant markets is most straightforward in “final goods” markets, in which a supplier sells a product like shoes to a customer and the customer receives value directly by consuming that product. Not all products follow the standard “final goods” model. Some products are best viewed as inputs to other products or services. For example, ink cartridges are inputs that are valuable only because they facilitate the use of another product: pens. These “inputs” exhibit what economists refer to

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<sup>220</sup> For example, even ignoring indirect network effects, an increase in the price of ad exchanges results in fewer matches on the exchange and, therefore, fewer matched impressions served on the ad server. As discussed below, the correct approach views the relevant product as matched impressions (transactions). See Section VI.C below.

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as “derived demand.”<sup>221</sup> That is, the value and customer demand for the input (ink cartridges) is dependent on (i.e., “derived” from) demand for another product (pens). In this matter involving ad tech, all of the markets alleged in the Complaint and put forward by Professor Gans are “inputs” in service of the provision of the ultimate, final good—matched digital ad impressions.

200) In “derived demand” (i.e., “input”) markets such as these, the profitability of a SSNIP depends not only on available substitutes for the input itself, but also on substitutes for the final product the input facilitates. Even if there were absolutely no substitutes for the input sold by a hypothetical monopolist, it does not automatically follow that the input alone constitutes a valid relevant product market. For example, a pencil is not a functional substitute for an ink cartridge—it cannot be inserted into a pen to make a functioning writing instrument. However, a SSNIP for ink cartridges might not be profitable—and a candidate market for ink cartridges might therefore fail the HMT—because consumers might turn to pencils instead of pens.<sup>222</sup>

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<sup>221</sup> Robert Pindyck and Daniel Rubinfeld, *Microeconomics*, Edition 9, Pearson, 2017, at p. 522.

<sup>222</sup> As another example, a small hand-held pencil sharpener’s demand is derived from the demand of customers who use pencils. Consequently, even if one established that all customers consider electric pencil sharpeners and knives to be poor functional substitutes for hand-held pencil sharpeners, this fact alone is not a sufficient economic basis to conclude that a hypothetical monopoly seller of hand-held pencil sharpeners could profitably impose a SSNIP. Rather, one would have to also consider how supply and demand for the tool (sharpeners) affect the demand for the final good (pencils). An increase in the price of pencil sharpeners would both (a) reduce the sales of pencil sharpeners directly and (b) interfere with the value proposition (and thus the demand) for pencils more generally.

The latter effect could, in turn, cause at least a small but significant number of consumers to substitute to other writing implements (e.g., mechanical pencils, pens, markers) or other methods of recording information (e.g., computers or other electronic devices) that are substitutes for pencils. This, in turn, would further reduce sales of pencil sharpeners, and the cycle might proceed iteratively leading to still further reductions in pencil sharpener sales. I note that these effects exist even while holding fixed the terms of sale in the market for pencils and other products outside the candidate market for sharpeners.

If substitution away from the final good is significant (e.g., substitution to mechanical pencils would dramatically reduce sales of pencil sharpeners), a hypothetical monopolist cornering the market on pencil sharpeners would be unable to profitably impose a SSNIP. If this is the case, the candidate “tools market for pencils” (e.g., a pencil sharpener-only market) fails the HMT; the “tools market for pencils” is not a properly defined relevant product market because it ignores an important constraint “outside” the candidate market (substitution away from pencils).



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201) Further, to determine whether a SSNIP for an input would be profitable in the context of multi-sided transaction platforms (or, alternatively, in the context of vertically integrated firms), the HMT must also account for the effect of the SSNIP on demand for the final good. For example, the Uber App is an input that facilitates transactions for rides (the final good) on Uber's ridesharing platform. While users pay for Uber rides, the Uber App itself is free. Suppose that if Uber increased the fee charged to consumers for use of its Uber App from its current price (zero) to a monthly subscription fee of \$1, all but a handful of Uber riders would instead substitute to Lyft. If one sought to apply an HMT to the Uber App as a distinct product from Uber rides and did not account for the effect of the price increase on demand for Uber rides, one would erroneously conclude that the "Uber App" is a relevant product market since the SSNIP would increase Uber's profits on use of its app (from zero to some positive number).<sup>223</sup> However, when one looks at the impact of the SSNIP holistically, considering both profits from app downloads *and* profits earned from fees charged for rides, the price increase is unlikely to be profitable. The reduction in riders using the app would result in fewer ride transactions and lower overall profits for Uber.<sup>224</sup>

### ***5. Multi-Homing and Sophisticated Intermediaries Reduce Switching Costs***

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<sup>223</sup> While technically this price increase is a large (rather than a small) significant increase in price, this is not the reason the price increase is unprofitable when one considers both sides of the market. I note that Professor Gans acknowledges in paragraph 235 of his report that the fee advertisers pay to use buying tools for small advertisers is zero (as advertisers pay the "media cost" of the inventory purchased). As discussed in my report, many publishers pay zero to use Google's publisher ad server.

<sup>224</sup> More generally, it is common for multi-sided transaction platforms to subsidize some customer groups to increase total output (transactions) through positive network effects. As examples, some credit card transaction platforms give cardholders "cash back" on transactions, while charging merchants a commission on every sale paid by credit card. In some transaction platforms prices are somewhat amorphaously defined and borne by multiple customer groups at once, such as the net commission ("take rate") deducted from the buyer's payment and retained before reimbursing a seller in an art or used car auction. In any given transaction platform setting, it is possible to conceive of a SSNIP in different ways. In a credit card market, a SSNIP could be thought of as an "other things equal" reduction in the "cash back" to a cardholder, or as an increase in the merchant fee—or even as a simultaneous increase in both cardholder and merchant fees. In an auction market for fine art, a SSNIP could be thought of as an increase in the commission, a new fee imposed specifically on buyers (e.g., an entry ticket to a live auction), a new fee imposed specifically on sellers (e.g., a listing fee), or any combination thereof.



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202) Economic theory indicates that when one or more customer groups “multi-home” by utilizing platforms that are both “inside” and “outside” of a candidate market, an “inside” SSNIP is less likely to be profitable.<sup>225</sup> Multi-homing reduces the cost to customers of diverting business to products “outside” of the market subject to the SSNIP.<sup>226</sup> Advertisers and publishers that multi-home on ad tech both “inside” and “outside” of a candidate market have low to no switching costs and are therefore more likely to respond to any adverse effects of a SSNIP “inside” a candidate market by redistributing ad spend or ad inventory to products “outside” of the market.<sup>227</sup> My independent review of the economic and marketing literature and the record is consistent with Professor Ghose’s opinion that advertisers

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<sup>225</sup> “Multihoming affects both the price level and the pricing structure. Not surprisingly, the price level tends to be lower with multihoming because the availability of substitutes tends to put pressure on the multi-sided firms to lower their prices.” (David S. Evans, “The Antitrust Economics of Multi-Sided Platform Markets,” *Yale Journal on Regulation*, Vol. 20, 2003, pp. 327-381, at p. 346).

<sup>226</sup> Multi-homing on “outside” products reduces switching costs because business relationships and technology are already in place to facilitate such a shift without the need for new investments in technology, personnel or contracting. Note that such shifts to “outside” products need not be large or “all or nothing” for them to render a SSNIP unprofitable. *See, e.g.*, Bruno Jullien, Alessandro Pavan and Marc Rysman, “Chapter 7 - Two-sided markets, pricing, and network effects,” in *Handbook of Industrial Organization*, Elsevier, Vol. 4, No. 1, ed. Kate Ho, Ali Hortaçsu and Alessandro Lizzeri, 2021, pp. 485-592.

<sup>227</sup> The marketing and economics literatures indicate that when switching costs are low (as is likely the case for digital advertising and for multi-homing firms in particular), firms continue to use inputs—i.e., each of the different types of ad tech utilized by an advertiser or a publisher—up to the point where the marginal benefit per dollar spent is equal for each input or activity. Optimal marketing mix allocation “requires that marketing-mix variables be set so as to equalize the ratio of marginal benefit to cost across all mix activities.” (Puneet Manchanda, Peter E. Rossi and Pradeep K. Chintagunta, “Response Modeling with Nonrandom Marketing-Mix Variables,” *Journal of Marketing Research*, Vol. 41, No. 4, 2004, pp. 467-478, at p. 467). *See also* Paul A. Samuelson, *Foundations of Economic Analysis*, New York Atheneum, 1965, at p. 60 (“In order for total costs to be at a minimum...the marginal productivity of the last dollar ( $1/\lambda$ ) must be equal in every use.”). Since profit-maximization requires using inputs in an efficient fashion, this optimality condition holds for both profit-maximizing and cost-minimizing entities. This implies that when an advertiser optimizes its budget for ad spend across seemingly different types of advertising (e.g., web and in-app display ads), it uses each type of advertising up to the point where marginal ROI is equalized for across each type. Consequently, when a hypothetical monopolist imposes an “inside” SSNIP and some advertisers are multi-homing on “inside” and “outside” products, marginal ROI equalization is disrupted: the marginal ROI on the “inside” product is now lower than for all “outside” products. Advertisers respond to this shift in ROI by trimming away budget from the ads subject to the price increase and toward ads that were not affected by the price increase. This is exemplified by advertisers adjusting their spending as the relative cost of online video advertising has gone down: “online video viewing grew 91% between 2015 and 2017, while ad spend grew 52%.” (Zenith, “Online video viewing to exceed an hour a day in 2018,” Zenith Media, July 16, 2018, available at: <https://www.zenithmedia.com/online-video-viewing-to-exceed-an-hour-a-day-in-2018/>.) The same is true for publishers. For example, suppose some publishers monetize their content by multi-homing on “inside” and “outside” products (e.g., they sell some of their ad space to advertisers via direct deals and some through indirect deals). Economic theory indicates that an optimizing publisher uses each method of monetizing content up to the point where the marginal benefits per dollar spent are equalized across “inside” and “outside” products. When a hypothetical monopolist imposes an “inside” SSNIP, this equalization is disrupted, making the marginal benefits per dollar spent on the “inside” product lower than on all “outside” products. Optimizing publishers respond by substituting away from the “inside” product to “outside” products (e.g., monetizing more content through direct deals).

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reallocate their advertising budgets in real time across different types of advertising formats, devices, and properties, with the goal of maximizing ROI.<sup>228</sup> As a matter of economics, the presence of multi-homing tends to make a SSNIP less profitable.

203) Other things equal, the greater the number of customers that multi-home “outside” a candidate market, and the greater their “inside” volumes, the less plausible is the candidate market.

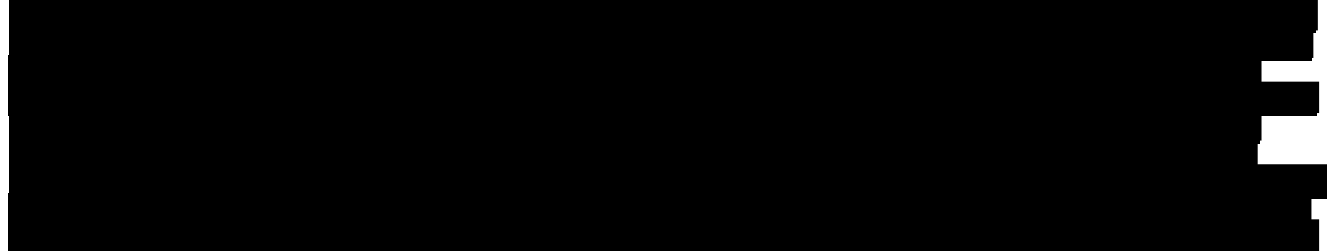
204) Economic theory indicates that middlemen and other intermediaries may limit the exercise of monopoly power by helping customers identify and use alternatives that are not controlled by the monopolist.<sup>229</sup> The ad tech industry has middlemen that have expertise using a variety of platforms to buy and sell ads both “inside” and “outside” Plaintiffs’ markets.<sup>230</sup> For example, ad agencies—which account for a significant portion of ad spend on DV360 and Google Ads<sup>231</sup>—make recommendations that help advertisers recognize when placing an ad on Facebook or another platform “outside” of

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<sup>228</sup> Ghose Report, at ¶19.

<sup>229</sup> Among other things, middlemen and intermediaries may reduce transactions costs, pool and diversify risk, lower the costs of matching and searching, alleviate adverse selection, mitigate moral hazard and opportunism, and support commitment through delegation. *See, for instance:* Daniel F. Spulber, *Market Microstructure: Intermediaries and the Theory of the Firm*, Cambridge University Press, 1999, at p. xiii.

<sup>230</sup> “DSPs are so complex that they are frequently not used or managed by the advertisers themselves (e.g., Ford), but by a specialized ad buying team (e.g., an ad agency or specialized division at an agency called a ‘trading desk’).” (Fourth Amended Complaint, at ¶73).



<sup>231</sup> More precisely, Figure 14, Figure 15, and Figure 16 show that the top 5 ad agencies are all larger in terms of ad spend than the largest advertiser (Meta) spending on Google Ads and DV360.

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Plaintiffs' candidate market can yield a higher ROI.<sup>232</sup> Likewise, publishing partners help publishers recognize when they can increase revenue by reallocating ad inventory to different types of ads.<sup>233</sup> Middlemen help market participants identify these and other profit opportunities. A SSNIP increases the value of middlemen, potentially leading customers who had been complacent with the status quo to identify and use different "tools" or platforms. For these reasons, relevant markets tend to be broader when middlemen are present to help customers respond to a SSNIP by identifying and operationalizing these and other opportunities.

## 6. Brown Shoe Factors

205) In *Brown Shoe Co. v. United States* ("*Brown Shoe*"), the U.S. Supreme Court laid out a set of seven "practical indicia" that may be considered in identifying "submarkets" within a "broad market."<sup>234</sup> These seven factors are: (1) "industry or public recognition of the submarket as a separate economic entity," (2) "the product's peculiar characteristics and uses," (3) "unique production facilities," (4) "distinct customers," (5) "distinct prices," (6) "sensitivity to price changes," and (7) "specialized

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<sup>232</sup> "A full-service advertising agency offers a wide range of services, making it a suitable choice for businesses that are new to advertising or want flexibility across different channels. These agencies are essentially one-stop shops, handling campaign management, social media, TV and print ads, content creation, SEO, and radio commercials. They also help clients optimize their ad spend based on their target audience's preferences." (Alexandra Samet, "Guide to ad agencies and holding companies: What they are and how they support marketing and advertising", eMarketer, July 3, 2024, available at: <https://www.emarketer.com/insights/advertising-companies/>).

<sup>233</sup> For example, "[a] Google Certified Publishing Partner is a company that we've reviewed and have proven to be experts using Google products, such as Google Ad Manager, and also provide publishers with innovative solutions and services." (Google Ad Manager Help, "Team up with a Google Certified Publishing Partner," available at: <https://support.google.com/admanager/answer/9489093>. Accessed July 26, 2024). Ezoic is an example of a Google Certified Publishing Partner: "Ezoic is the first and only automated website testing company to be selected and certified by Google Adsense to... become a Google Certified Publishing Partner. Ezoic was selected [due to] the amazing results that Adsense publishers see from using our machine learning platform to increase revenue." (Ezoic, "Google Certified Publishing Partner," available at: <https://www.ezoic.com/google-certified-publishing-partner/>. Accessed July 26, 2024).

<sup>234</sup> *Brown Shoe Co. v. United States*, 370 U.S. 294, 82 S. Ct. 1502 (1962) ("*Brown Shoe*"), at p. 325.

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vendors.”<sup>235</sup> Some of the seven practical indicia relate to the identification of demand substitution patterns and some others relate to the identification of supply substitution patterns.<sup>236</sup>

206) Utilizing the seven *Brown Shoe* factors requires comparison of a product inside a candidate market with a product outside of a candidate market to determine whether it is appropriate to exclude that product. For example, *Brown Shoe* factor #1 would require examining industry sources indicating two products are in the same market or different markets. *Brown Shoe* factor #2 requires showing that a product inside a candidate has characteristics and uses that differ from characteristics of a product outside the candidate market. *Brown Shoe* factors #3, #4, and #7 require showing that characteristics of production facilities, customers, and vendors (suppliers) associated with a product in a candidate market are different from those of a product outside of that market. *Brown Shoe* factor #5 requires showing that pricing of products inside the candidate is different from products outside that market.<sup>237</sup> *Brown Shoe* factor #6 requires showing that factors related to the elasticity of demand for a product inside a candidate market are different from products outside that market.

207) Qualitative *Brown Shoe* factors may be useful in circumstances where data are lacking—for example, if a product has yet to enter the market—but may be inferior to other approaches when data are

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<sup>235</sup> *Brown Shoe Co. v. United States*, 370 U.S. 294, 82 S. Ct. 1502 (1962) (“*Brown Shoe*”), at p. 325.

<sup>236</sup> Jonathan B. Baker, “Stepping Out in an Old *Brown Shoe*: In Qualified Praise of Submarkets,” *Antitrust Law Journal*, Vol. 68, 2000, pp. 203-218, at p. 205. For example, industry recognition of the market can be used as indirect evidence of consumer recognition of a separate market, as the industry has an interest in understanding and recognizing consumer patterns; product peculiarities, distinct customers, distinct prices, and specialized vendors are suggestive of gaps in available substitutes for a product, and thus can provide information about likely demand substitution patterns. On the other hand, industry recognition of the market and peculiar product characteristics can be also indicators of how flexible seller production may be, the nature of barriers to entry for that market, and therefore market power of relevant market players; further, unique production facilities appear related to the identification of seller substitution patterns.

<sup>237</sup> The Court explicitly indicates that this does not amount to dividing a market into markets based on the prices they charge. “It would be unrealistic to accept *Brown*’s contention that, for example, men’s shoes selling below \$8.99 are in a different product market from those selling above \$9.00.” (*Brown Shoe Co. v. United States*, 370 U.S. 294, 82 S. Ct. 1502 (1962) (“*Brown Shoe*”), at p. 326).

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available to analyze customer substitution patterns.<sup>238</sup> Moreover, *Brown Shoe* factors are not well suited for defining relevant markets where indirect network effects are present.<sup>239</sup> *Brown Shoe* analysis, which focuses only on superficial similarities among products, is incapable of incorporating these important effects. Absent additional analysis, use of *Brown Shoe* factors to define a market in which network effects play an important role will provide an unreliable market definition.

**B. Professor Gans' Assessment of the Relevant Markets Is Flawed and Unreliable**

208) Professor Gans opines that there are three distinct *relevant* antitrust markets in this matter: publisher ad servers used for the programmatic sale of open web display impressions, ad exchanges for transacting indirect open web display impressions, and ad buying tools for small advertisers for buying open web display impressions.<sup>240</sup> He also concludes that there is “a complementary market for large advertising tools purchasing open web display advertising, also called DSPs” but does not indicate that

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<sup>238</sup> Pleatsikas and Teece note that “*Brown Shoe* is still utilized from time to time, despite the fact that economic analysis and agency thinking has long eclipsed it ... [*Brown Shoe*] indicia for identifying markets ... and for assessing market power within those markets ... are particularly ill-suited to analyzing high technology markets.” (Christopher Pleatsikas and David Teece, “The analysis of market definition and market power in the context of rapid innovation,” *International Journal of Industrial Organization*, Vol. 19, No. 5, 2001, pp. 665-693, at pp. 672-673).

In his antitrust treatise, Professor Hovenkamp characterizes the *Brown Shoe* factors as “inferior” to the HMT, and “just plain wrong” across several dimensions. Professor Hovenkamp concludes that “[i]n virtually every way, the HMT relevant market test is superior to *Brown Shoe*.” (Herbert Hovenkamp, “Antitrust Market Definition: the Hypothetical Monopolist and Brown Shoe,” *Network Law Review*, April 4, 2024, available at: <https://www.networklawreview.org/hovenkamp-market-definition/>.) Professor Hovenkamp also finds that the FTC’s and DOJ’s “excessive reliance on . . . *Brown Shoe*” in the revised merger guidelines to be “unfortunate – particularly since that decision has been so often repudiated, even by the Supreme Court itself.” (Herbert Hovenkamp, “The 2023 Merger Guidelines: Law, Fact, and Method,” *Review of Industrial Organization*, 2024, pp. 1-39, at p. 1).

As Jonathan B. Baker, former Director of the Bureau of Economics at FTC, has stated: “[t]here should be little controversy about the *Brown Shoe* practical indicia to the extent they are used as proxies for demand and supply substitutability.” (Jonathan B. Baker, “Stepping Out in an Old *Brown Shoe*: In Qualified Praise of Submarkets,” *Antitrust Law Journal*, Vol. 68, No. 1, 2000, pp. 203-218, at p. 207).

<sup>239</sup> This is not a criticism of *Brown Shoe*; indeed, the 1962 *Brown Shoe* factors predate the economic literature on multi-sided markets and indirect network effects which began in the early 2000’s.

<sup>240</sup> Gans Report, at ¶136 (“The first relevant market I evaluate and identify in this report is the market for publisher ad servers used for the sale [sic] open web display inventory.”), 178 (“The second relevant market that I define is the market for ad exchanges for transacting indirect open web display advertising.”), 224 (“The third relevant market that I define for the purposes of analyzing Google’s conduct is the market for ad-buying tools for small advertisers for buying open web display advertising.”).

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it is a relevant antitrust market.<sup>241</sup> According to Professor Gans, the geographic scope of all these antitrust markets is the United States.<sup>242</sup> His conclusions are purportedly based on two methodologies: a qualitative assessment of *Brown Shoe* factors; and the HMT.<sup>243</sup> As described in more detail below, his employment of each of these methods suffers from several fundamental flaws that as a matter of economics render his opinion on market definition unreliable.

209) Plaintiffs' candidate product markets are artificially narrow and inappropriate for analyzing their antitrust claims. Professor Gans not only has failed to establish that a hypothetical monopolist could profitably raise price in any of his independent candidate product markets, he has not considered—let

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<sup>241</sup> Gans Report, at ¶277. *See also* Gans Report, at ¶288. (“Based on the same approaches (e.g., Brown Shoe and HMT) and for the same reasons that I evaluated above to find a relevant market for ad buying tools for small advertisers for the buying of open web display advertising space, I also find a complementary market for large advertising tools purchasing open web display advertising. My analysis regarding small advertiser ad buy tools applies equally here.”).

<sup>242</sup> Gans Report, at ¶289. (“In this section, I explain that the relevant geographic market for assessing the challenged conduct is the United States.”). Although Professor Gans defines his geographic market as the United States, his statements suggest a variety of potential definitions based on either locations of customers (e.g., locations of advertisers or publishers using ad tech) (*see* Gans Report, at ¶292); locations of ad tech firms (*see* Gans Report, at ¶291); or locations of internet users (*see* Gans Report, at ¶290). For instance, Professor Gans states: “publishers and advertisers using ad servers, exchanges, or ad buying tools are subject to distinct regulatory limitations across geographies. In particular, regulations around user privacy and advertising deceptive trade practices vary from country to country.” (Gans Report, at ¶292). With respect to ad tech firm, Professor Gans claims that “[f]rom a technological perspective, geographies outside the U.S. can lead to network latency. For this reason, competitors in these markets must have local equipment. This means further that the competitors can differ in each geography.” (Gans Report, at ¶291). Concerning users, Professor Gans asserts that “[w]ebsite users outside the U.S. do not participate in these markets, and users in the U.S. do not utilize these markets in other geographies. An advertiser tailors its advertising campaign to its audience and customizes its ads to customer preferences across geographies.” (Gans Report, at ¶290). His data analyses utilize multiple, conflicting definitions of his geographic market definition (*compare* Gans Report, at ¶¶260 (“‘Billing country code’ is filtered into ‘US’”), 373 (“The geography of this dataset is restricted to North America.”), 843 (“‘country\_criteria\_id’ is set to be ‘2840’ (US)”). These inconsistencies undermine the reliability of his market definition analyses and the conclusions he draws—as one cannot ascertain from his report the precise bounds of his four candidate markets.

<sup>243</sup> Gans Report, at ¶¶145 (“In this section, I define the relevant market by using both evidence of qualitative market characteristics or practical indicia (Brown Shoe factors) and the hypothetical monopolist test (HMT).”), 184 (“In what follows, I define this relevant market using qualitative market evidence or practical indicia (Brown Shoe factors) and employing a hypothetical monopolist test.”), 231 (“In this section, I continue to define the relevant market by using both evidence of qualitative market characteristics or practical indicia (Brown Shoe factors) and the hypothetical monopolist test.”), 288 (“Based on the same approaches (e.g., Brown Shoe and HMT) and for the same reasons that I evaluated above to find a relevant market for ad buying tools for small advertisers for the buying of open web display advertising space, I also find a complementary market for large advertising tools purchasing open web display advertising.”).

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alone established—whether a hypothetical monopolist operating an integrated ad tech stack in a multi-sided market could do so.

**1. Professor Gans Cherry Picks and Misapplies Brown Shoe Factors to Support His Market Definitions**

210) Professor Gans cherry picks only three of the seven *Brown Shoe* factors to argue that each of his candidate markets are antitrust markets, describing these three factors as: “industry or public recognition of the market,”<sup>244</sup> “peculiar characteristics and uses,”<sup>245</sup> and “a distinct and independent price structure.”<sup>246</sup> As explained below, Professor Gans misapplies the three *Brown Shoe* factors that he considers, and his evaluation of the remaining four factors does not support the artificially narrow markets that Professor Gans proffers.

211) Economists recognize that *Brown Shoe* analysis is prone to error in settings, such as ad tech, where companies compete through quality and innovations and emphasize “peculiar characteristics and

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<sup>244</sup> Gans Report, at ¶127 (“In the seminal *Brown Shoe* case, the U.S. Supreme Court instructed that practical indicia can be used to define a relevant product market. These indicia include industry or public recognition of the market as a separate economic entity, the product’s peculiar characteristics and uses, unique production facilities, distinct customers, distinct prices, sensitivity to price changes, and specialized vendors.”). See Gans Report, at ¶¶152-154, 188-190, 233-234 (All of these have the subsection title “Industry or public recognition of the market”). For his product market “ad buying tools for large advertisers,” Professor Gans discusses *Brown Shoe* factors and HMT in the same subsection and not separately as he does for the other three candidate markets. (Gans Report, ¶¶277-288).

<sup>245</sup> Gans Report, at ¶127 (“In the seminal *Brown Shoe* case, the U.S. Supreme Court instructed that practical indicia can be used to define a relevant product market. These indicia include industry or public recognition of the market as a separate economic entity, the product’s peculiar characteristics and uses, unique production facilities, distinct customers, distinct prices, sensitivity to price changes, and specialized vendors.”). See Gans Report, at ¶¶146-151, 185-187, 232 (All of these have the subsection title “Peculiar characteristics and uses”). For his product market “ad buying tools for large advertisers” Professor Gans discusses *Brown Shoe* factors and HMT in the same subsection and not separately as he does for the other three candidate markets. (Gans Report, ¶¶277-288).

<sup>246</sup> Gans Report, at ¶127 (“In the seminal *Brown Shoe* case, the U.S. Supreme Court instructed that practical indicia can be used to define a relevant product market. These indicia include industry or public recognition of the market as a separate economic entity, the product’s peculiar characteristics and uses, unique production facilities, distinct customers, distinct prices, sensitivity to price changes, and specialized vendors.”). See Gans Report, at ¶¶155-156, 191, 235-236 (All of these have the subsection title “A distinct and independent price structure”). For his product market “ad buying tools for large advertisers” Professor Gans discusses *Brown Shoe* factors and HMT in the same subsection and not separately as he does for the other three candidate markets. (Gans Report, ¶¶277-288).



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uses” to market their products.<sup>247</sup> Products (e.g., publisher ad servers and in-app mediation tools) do not need to share all of the same features to compete in the same relevant market and qualify as economic substitutes.<sup>248</sup> By focusing on similarities in an arbitrary set of product characteristics, rather than on what customers view as substitute products, Professor Gans fails to consider that product differentiation can itself be a form of competition. As economists recognize, failing to account for the significance of product differentiation in evaluating practical indicia of substitution can risk defining markets too narrowly, as Professor Gans has done.<sup>249</sup>

212) Moreover, although Professor Gans effectively acknowledges that indirect network effects impact incentives in his analysis, he ignores these indirect network effects in defining relevant markets.<sup>250</sup> Professor Gans’ reliance on *Brown Shoe* factors does not account for the role that indirect

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<sup>247</sup> See, e.g., Christopher Pleatsikas and David Teece, “The analysis of market definition and market power in the context of rapid innovation,” *International Journal of Industrial Organization*, Vol. 19, No. 5, 2001, pp. 665-693, at p. 674 (“A ‘product’s peculiar characteristics and uses’ are even less useful, since products (and services) in many high technology industries are highly differentiated. Subdividing the relevant market based on the very product differentiation that is one of the fundamental bases for competition risks defining markets much too narrowly and overstating market power, so that monopoly power is found where none, in fact, exists.”), p. 668 (“In US antitrust jurisprudence, there are two main categories of traditional indicia commonly used to define markets and derive measures of market power. These are (1) the methods contained in the Horizontal Merger Guidelines and (2) indicia that roughly correspond to those identified in *Brown Shoe*. These have been utilized by the courts as if they are universally applicable, without regard to industry context. Unfortunately, context is extremely important, and these indicia, particularly the *Brown Shoe* indicia, are not well-suited for analysis of high technology industries.”).

<sup>248</sup> Massimo Motta, “Competition policy: theory and practice,” Cambridge University Press, 2004, Chapter 3, available at: [https://danielmorochoruiz.wordpress.com/wp-content/uploads/2015/09/massimo\\_motta\\_competition\\_policy\\_theory\\_and\\_prabookfi-org.pdf](https://danielmorochoruiz.wordpress.com/wp-content/uploads/2015/09/massimo_motta_competition_policy_theory_and_prabookfi-org.pdf), at pp. 9-10 (“Conversely, the fact that two products obviously differ does not mean that they cannot be included in the same market: trains and buses are indeed different products, but to the extent that they provide a similar service in transporting people from city A to city B they might well include in the same market.”).

<sup>249</sup> Christopher Pleatsikas and David Teece, “The analysis of market definition and market power in the context of rapid innovation,” *International Journal of Industrial Organization*, Vol. 19, No. 5, 2001, pp. 665-693, at p. 674 (“A ‘product’s peculiar characteristics and uses’ are even less useful, since products (and services) in many high technology industries are highly differentiated. Subdividing the relevant market based on the very product differentiation that is one of the fundamental bases for competition risks defining markets much too narrowly and overstating market power, so that monopoly power is found where none, in fact, exists.”).

<sup>250</sup> Professor Gans explains that “ad tech tools facilitate the advertising transaction between publishers and advertisers.” (Gans Report, at ¶132). Professor Gans notes that it is “reasonable to consider ad tech tools as bringing the two sides of the market together (i.e., transaction demand from advertisers and supply from publishers). The products in each of the relevant product markets I define . . . facilitate transactions between publishers and advertisers.” (Gans Report, at ¶132, fn. 101). He also notes that “[a]dvertisers can benefit



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network effects play in defining relevant product markets. Indirect network effects are important in this case because the alleged conduct centers on Google's role as a multi-sided platform that matches advertisers with publisher impressions displayed to users.

*a. Professor Gans Misapplies Brown Shoe's "Industry or Public Recognition" Factor to Support Artificially Narrow Markets*

213) First, Professor Gans asserts that each of his candidate relevant markets are supported by "industry or public recognition of the market."<sup>251</sup> However, there is no industry or public recognition of his narrow definition of display ads—let alone industry or public recognition of markets for: (i) ad servers for programmatic sale of Professor Gans' narrow definition of display ads; (ii) ad exchanges for transacting Professor Gans' narrow definition of display ads; or (iii) ad buying tools for purchasing Professor Gans' narrow definition of display ads. Professor Gans offers no independent opinion or reference to literature or the record—to the contrary, Professor Gans relies upon ordinary course Google

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from more publishers joining an individual ad exchange," and "[s]imilarly, publishers benefit from more advertisers available in an ad exchange as it results in higher and more varied demand for their inventory." (Gans Report, at ¶¶381-382). Professor Gans' theories of competitive harm also rely on the presence of indirect network effects. For example, he describes a "virtuous cycle" that depends upon Google leveraging "AdX's market power, since publishers seeking to sell inventory to those advertisers must use AdX." (Gans Report, at ¶457).

<sup>251</sup> Gans Report, at ¶¶152-154 ("Third parties have indicated that they consider publisher ad servers used for the sale of open web display advertising to be a distinct product or a separate market. According to Professor John Chandler, an industry expert, participants consider publisher ad servers to be a distinct product and a separate market from an industry perspective. They do not consider publisher ad servers to be an input into a larger product or service. Antitrust regulatory agencies in the United States and around the world have also recognized the existence of a distinct publisher ad server market."), 188-190 ("Third parties have indicated that they consider ad exchanges for transacting open web display advertising to be a distinct product or a separate market. According to Professor Chandler, an industry expert, industry participants consider ad exchanges as a distinct product and a separate market. They do not consider ad exchanges combined with publisher ad servers or ad buying tools as the relevant product. Regulatory agencies have also recognized the existence of a distinct ad exchange market."), 233-234 ("Third parties have indicated that they consider ad buying tools for small advertisers for buying open web display advertising to be a distinct product or a separate market. According to Professor John Chandler, an industry expert, industry participants consider ad buying tools for small advertisers to be a distinct product and a separate market from an industry perspective.").

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documents that may categorize data in a manner that is inconsistent with his market definitions<sup>252</sup>—and merely refers to a conversation with Professor Chandler in support of his market definition.<sup>253</sup>

214) Nor has Professor Gans provided evidence of industry or public recognition of ad buying tools to limit buying tools for small advertisers from other buying tools used by advertisers.<sup>254</sup> Professor Gans defines his candidate market for small advertiser buying tools by reference to a conversation with Professor Chandler just three days before submission of his report.<sup>255</sup> He attributes his definition of a “small advertiser” to an unsupported reference to “Google’s characterization” of these words.<sup>256</sup> And when Professor Gans identifies competitors in his candidate market, he provides inconsistent lists of firms and provides no explanation of the criteria he utilized to select those few advertiser buying tools

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<sup>252</sup> Gans Report, at ¶353, fn. 381.

<sup>253</sup> Gans Report, at ¶153, fn. 133, ¶189, fn. 182, ¶234, fn. 226 (Each of these footnotes cite to “Conversation with John Chandler, June 4<sup>th</sup>, 2024.”).

<sup>254</sup> “A demand-side platform (DSP) is an advertising technology (AdTech) platform that allows advertisers working at brands and ad agencies to buy inventory (i.e., ad space) on an impression-by-impression basis from publishers via supply-side platforms (SSPs) and ad exchanges. DSPs enable media buyers (advertisers and agencies) to purchase a range of inventory from many different publishers all from one user interface.” (Mike Sweeney, “What Is a Demand-Side Platform (DSP) and How Does It Work?” Clearcode, January 31, 2024, available at: <https://clearcode.cc/blog/demand-side-platform/>). “A demand-side platform (DSP) is software that advertisers use to buy video, display, and mobile ads. A DSP is a single, organized marketplace where advertisers access publisher inventory through direct integrations, supply-side platforms (SSPs), and ad exchanges. As its name implies, a DSP is driven by the demand side of the advertising equation: advertisers seek inventory that will help them reach the right audiences at the right time, within a defined budget.” (Amazon Ads, “What is adtech and why is it important?” available at: <https://advertising.amazon.com/library/guides/what-is-adtech>. Accessed August 6, 2024).

<sup>255</sup> “Third parties have indicated that they consider ad buying tools for small advertisers for buying open web display advertising to be a distinct product or a separate market. According to Professor John Chandler, an industry expert, industry participants consider ad buying tools for small advertisers to be a distinct product and a separate market from an industry perspective.” (Gans Report, at ¶¶233-234). The footnote reads, “Conversation with Prof. John Chandler, June 4th, 2024.” (Gans Report, at ¶234, fn. 226).

<sup>256</sup> Professor Gans states that he “use[s] Google’s characterization of small advertisers, as [he] describe[s] in this section.” (Gans Report, at ¶224, fn. 220). He does not indicate what “Google’s characterization” is nor cite to a document. It is unclear how Professor Gans operationalizes this unspecified characterization of “small advertiser.”

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from the hundreds of display ad buying tools reported in the data.<sup>257</sup> These ambiguities and inconsistencies render Professor Gans' market definition analysis not scientifically reproducible.

*b. Professor Gans Misapplies Brown Shoe's "Peculiar Characteristics and Uses" Factor to Support Artificially Narrow Markets*

215) A focus on "peculiar characteristics and uses" undercuts Professor Gans' gerrymandered definition of a market for ad servers for the programmatic sale of open web display inventory.<sup>258</sup> As Professor Gans acknowledges, a publisher ad server can be used to match distinct formats of advertising (e.g., in-app or video) and distinct matching methods (e.g., programmatic or direct deals) with users.<sup>259</sup> Examples of servers that allow publishers to fill a variety of ad space types with a wide variety of ad formats include DFP, Kevel, and Microsoft's Xandr.<sup>260</sup> Yet, Professor Gans defines a market based only

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<sup>257</sup> Compare tools listed in Gans Report, at Table 3. (Google Ads, Yahoo! Advertising, Taboola, Microsoft Advertising, and Criteo) with the ad buying tools he includes in his Figure 10, as noted in his fn. 458 ("For this figure, ad buying tools for small advertisers include Google Ads, Marketgid, TellApart, Netmining, ShareThis, Infectious Media IDB, Criteo (JP), Criteo (US), Yahoo - RMX - NA, Yahoo - Display & App (EB), and AppNexus."). (Gans Report, at Table 3; Gans Report, at Figure 10, fn. 458).

<sup>258</sup> Gans Report, at ¶¶146-151. For example, Professor Gans notes that "[p]ublisher ad servers have peculiar characteristics that distinguish them from other means by which publishers might offer advertising space to advertisers. Publisher ad servers used for the sale of open web display advertising (1) enable real-time decisions about serving ads on a publisher website or platform; (2) they manage and ultimately sell publishers' ad inventory; (3) they offer targeting capabilities to help publishers identify specific audience segments, and (4) the server software collects data and reports on ad performance." (Gans Report, at ¶146).

<sup>259</sup> Gans Report, at ¶138. ("Ad servers can be used by publishers to offer display advertising, in-app advertising, and video advertising. It can also be used to facilitate direct deals with advertisers. However, publishers that sell display ad space on the open web must use an ad server. Effective substitution by publishers selling web display inventory would imply switching entirely from the open web to an alternative type of inventory most publishers do not have, such as in-app advertising where another tool, other than an ad server can be used. The substitution away from open web display advertising would have to be complete. This is because if a publisher sells both in-app and open web display, it must still use an ad server. This alone does not mean that a monopolist that owned all publisher ad servers could not exercise market power.").

<sup>260</sup>

also

See

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on the programmatic open web display output of this tool. Such a definition is not supported by the “peculiar characteristics and uses” under *Brown Shoe*.

216) In addition, Professor Gans has no valid basis to conclude that use of the *Brown Shoe* factor “peculiar characteristics and uses” indicates a distinct market for ad exchanges for transacting indirect narrow display advertising space.<sup>261</sup> Ad exchanges generally facilitate the transaction of various digital ad types.<sup>262</sup> For instance, AdX, offers advertisers and publishers the means to transact a wide variety of types of digital ads, including open web display ads, video ads, in-app ads, and CTV ads.<sup>263</sup> Other examples of ad exchanges that allow advertisers and publishers to transact multiple digital ads, including open web display ads, are Index Exchange, PubMatic, Xandr, and Magnite to name a few.<sup>264</sup>

217) A focus on “peculiar characteristics and uses” similarly fails to support Professor Gans’ candidate markets for ad buying tools.<sup>265</sup> For example, Google Ads, which is part of Professor Gans’

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<sup>261</sup> Gans Report, at ¶¶185-187. For instance, Professor Gans claims that an “ad exchange is a software product that has the following distinct features. First, it enables the programmatic trading of impressions through auctions. Second, it connects and gathers data from sell-side and buy-side tools.” (Gans Report, at ¶186).

<sup>262</sup> Professor Gans notes that “[w]hile an ad exchange can transact several types of inventories, they are primarily used to transact indirect open web display advertising.” (Gans Report, at ¶179).

<sup>263</sup> Google Ad Manager Help, “Inventory Formats,” available at: <https://support.google.com/admanager/answer/9796545>. Accessed July 26, 2024.

<sup>264</sup> Index Exchange, “For Marketers and Agencies,” available at: <https://www.indexexchange.com/solution/marketers-agencies/>. Accessed July 26, 2024; Index Exchange, “Channels and Formats,” available at: <https://www.indexexchange.com/product/channels-formats/>. Accessed July 26, 2024; PubMatic, “PubMatic SSP: Maximize Advertising Revenue and Control How Your Audiences are Accessed,” available at: <https://pubmatic.com/products/pubmatic-ssp-for-publishers/>. Accessed July 26, 2024; Microsoft Advertising, “Publisher Platforms,” available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/publisher-platforms-scaled-buying-selling-solutions>. Accessed July 26, 2024; Magnite, “Sellers,” available at: <https://www.magnite.com/sellers/>. Accessed April 24, 2024;

<sup>265</sup> Gans Report, at ¶232 (“An ad-buying tool for small advertisers is a software product that connects to ad exchanges and publisher ad servers, enables the purchasing of ad inventory and makes this process relatively easy to use and manage for advertisers. Advertisers use these ad tech tools to purchase ads to fulfil their campaign.”).

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market for buying tools for small advertisers for buying open web display ads, allows advertisers to buy not only open web ads, but in-app ads,<sup>266</sup> video ads,<sup>267</sup> and a host of other formats.<sup>268</sup> Likewise, DV360, which is part of Professor Gans' market for buying tools for large advertisers for buying open web display ads, allows advertisers to purchase a diverse spectrum of digital ads, including open web display ads, video ads, and in-app ads.<sup>269</sup> The same is true for non-Google products: the ad buying tools that "small advertisers" and "large advertisers" can use to purchase open web display ads allow them to also purchase in-app ads, video ads, and other types of ads.<sup>270</sup> Examples of such ad buying tools include, among others, Amazon Ads, The Trade Desk, Criteo, and Microsoft Xandr's Invest DSP.<sup>271</sup> Hence, the ad tools that advertisers use for open web display ads are the very same ad buying tools used to buy other types of online advertising, and thus by the *Brown Shoe* logic, share the same "peculiar characteristics

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<sup>266</sup> Google Ads campaigns by default include in-app advertising as long as the advertiser's targeting settings are satisfied. (Google, "Show your ads in mobile apps," available at: <https://support.google.com/google-ads/answer/1722057>. Accessed August 6, 2024).

<sup>267</sup> Google Ads offers tools that enable advertisers to create in-stream video ad creatives. (Google, "Create a video campaign," available at: <https://support.google.com/google-ads/answer/2375497>. Accessed August 6, 2024). Google also offers "responsive display ads," which take advertisers' "existing image and text assets" and automatically creates video ads based on them. (Google, "A new look for responsive display ads," available at: <https://support.google.com/google-ads/answer/9975738>. Accessed August 6, 2024).

<sup>268</sup> "Display campaigns serve visually engaging ads on the Google Display Network. The Display Network helps you reach people as they browse millions of websites, apps, and Google-owned properties (such as YouTube and Gmail)." (Google Ads Help, "About Display ads and the Google Display Network," available at: <https://support.google.com/google-ads/answer/2404190>. Accessed July 26, 2024).

<sup>269</sup> "Display & Video 360 enables marketers to manage their ... campaigns across display, video, TV, audio, and other channels, all in one place." (Google Marketing Platform, "Product Overview: Display & Video 360," available at: [https://services.google.com/fh/files/misc/display\\_and\\_video\\_360\\_product\\_overview.pdf](https://services.google.com/fh/files/misc/display_and_video_360_product_overview.pdf). Accessed August 6, 2024).

<sup>270</sup> Professor Gans acknowledges that small advertisers can use their "ad buying tools" to purchase "several types of inventories, such as display inventory," including "video inventory, in-app inventory, Connected TV inventory, [and] search inventory." (Gans Report, at ¶226). Professor Gans also acknowledges that "[a]d buying tools for large advertisers can transact several types of advertising such as display advertising, in-app advertising, video advertising, Connected TV advertising, and direct deals." (Gans Report, at ¶284).

<sup>271</sup> Amazon Ads, "Amazon DSP ad dimensions and specifications," available at: <https://advertising.amazon.com/resources/ad-specs/dsp>. Accessed July 26, 2024; The Trade Desk, "Omnichannel Programmatic Advertising," available at: <https://www.thetradedesk.com/us/our-platform/omnichannel-advertising>. Accessed July 26, 2024; Criteo, "Display Advertising, A-to-Z," available at: <https://www.criteo.com/digital-advertising-glossary/display-advertising/>. Accessed August 6, 2024; Microsoft Advertising, "Advertiser Platform," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/advertiser-platform-invest-dsp-premium-content>. Accessed March 25, 2024.

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and uses.” This *Brown Shoe* factor, therefore, provides no basis for limiting a buying tools market to Professor Gans’ narrow definition of open web display ads.

*c. Professor Gans Misapplies Brown Shoe’s “Distinct and Independent Price Structures” Factor to Support Artificially Narrow Markets*

218) Professor Gans asserts that the open web display ad tech in his candidate markets have “distinct and independent price structure[s].”<sup>272</sup> His conclusion relies upon his Table 1, Table 2, and Table 3.<sup>273</sup> These tables—which purport to summarize price structures *within* his candidate markets for ad servers, ad exchanges, and ad buying tools for small advertisers, respectively—provide no useful information about whether products *excluded* from his candidate markets have different price structures. Without such comparison, it is unclear whether the “distinct and independent price structure” factor indeed supports excluding other products from the relevant market, and application of the *Brown Shoe* factor is meaningless. For example, his Table 3, which summarizes pricing models of “of display ad campaigns in competing ad buying tools for small advertisers,”<sup>274</sup> does not mention that ad buying tools that Professor Gans excludes from his “small advertiser” buying tool market, such as DV360, also sell ads on a CPC basis.<sup>275</sup>

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<sup>272</sup> Gans Report, at ¶¶127, 155-156, 191, 235-236.

<sup>273</sup> Gans Report, at ¶¶156, Table 1, 191, Table 2, 236, Table 3.

<sup>274</sup> According to Professor Gans, “[a]d-buying tools for small advertisers for buying open web display advertising are not transparent about their fees. They often charge advertisers based on the “media cost” of the inventory purchased, which can be charged in different ways, such as cost-per-click (CPC), cost-per-thousand impressions (CPM), cost-per-view (CPV), cost-per-action (CPA), or on a pay-per-sales model (CPS).” (Gans Report, at ¶235).

<sup>275</sup> Deposition of Nirmal Jayaram (Google) on April 26, 2024 (hereafter “Jayaram (Google) Deposition”), at 29:6-10. (“Advertisers specify their willingness to pay through different types of constraints such as, as I described, a fixed cost per acquisition or a target cost per acquisition or a maximum cost per click [on AdWords and DV360].”). *See also, e.g.*, Display & Video 360 Help, “Create an insertion order,” available at: <https://support.google.com/displayvideo/answer/2696705#zippy=%2Creal-time-bidding>. Accessed July 26, 2024; Yelp Business Help Center, “How does Yelp’s Cost Per Click (CPC) advertising program work?” available at:

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219) Professor Gans' summaries in Table 1, Table 2, and Table 3 hardly qualify as an economic analysis of the pricing structures for ad tech. Even so, the Tables do not necessarily support a conclusion that products within Professor Gans' candidate markets for ad servers or ad exchanges have a similar pricing structure. Table 1, which summarizes pricing models for three publisher ad servers,<sup>276</sup> describes different pricing models for each of the three ad servers included.<sup>277</sup> Table 2, which summarizes pricing models for ad exchanges,<sup>278</sup> concedes that not all ad exchanges for narrow display advertising follow a revenue share model, begging the question of what other pricing structures, if any, may be appropriate for in-market products.<sup>279</sup>

220) Finally, while Professor Gans notes that his narrow definition of display advertising is priced differently from search and video advertising,<sup>280</sup> advertisers make decisions on the basis of returns. By

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[https://biz.yelp.com/support-center/Advertising\\_on\\_Yelp/Yelp\\_Ads/How-does-Yelp-s-Cost-Per-Click-CPC-advertising-program-work/en-US](https://biz.yelp.com/support-center/Advertising_on_Yelp/Yelp_Ads/How-does-Yelp-s-Cost-Per-Click-CPC-advertising-program-work/en-US). Accessed June 21, 2024; Amazon Ads, "Cost-per-click bids," available at: <https://advertising.amazon.com/help/GTX8JYBTJX5EUCZW>. Accessed July 26, 2024. Table 3 also does not mention that Google Ads also allows advertisers to purchase on a CPM basis.

<sup>276</sup> In his analysis about "independent price structure" for publisher ad servers, Professor Gans argues that "Google's publisher ad server does not charge publishers up to a certain volume of impressions served. Publishers who sell volumes above this floor qualify for Google's ad publisher server's paid tier with the basic cost of a license starting from [REDACTED] per month. DFP offers several pricing plans to publishers." (Gans Report, at ¶155).

<sup>277</sup> Gans Report, at ¶156, Table 1. (According to the table, DFP has a pricing model as follows: "Small Business and Premium products with CPM volume tiers; Additional fees for add-on services; Higher fees for other types of inventory such as video inventory, Connected TV inventory, and direct deals." According to the table, AdButler has a pricing model as follows: "Free trial period; monthly fee varies based on ad requests and number of advertisers." According to the table, Broadstreet Ad Server has a pricing model as follows: "Monthly fee varies based on add-on features.").

<sup>278</sup> In his analysis about "independent price structure" for ad exchanges, Professor Gans notes that "Ad exchanges charge publishers a take-rate that is a percentage taken from the revenue transacted through the exchange. In a 2017 competitive analysis, Google described the pricing structure of rival ad exchanges. In the table below, I summarize the pricing models of the other ad exchanges based on Google's analysis. These models are different than, for example, the pricing of publisher ad servers, as shown above." (Gans Report, at ¶191).

<sup>279</sup> Gans Report, at ¶191, Table 2. (According to the table, PubMatic has a pricing model as follows: "Single agency-controlled fee model for all media buys transacted on the PubMatic platform.").

<sup>280</sup> Gans Report, at ¶¶252 ("Search and display advertising are priced differently. The average CPC for search advertising in Google Ads is [REDACTED] versus for display is [REDACTED]."), 260 ("My analysis of Google data shows that in-stream video ads have very different price structure from open web display ads. For example, in 2022, in-stream video ads have much higher CPM than display ads, [REDACTED] vs [REDACTED] in Google Ads and [REDACTED] vs [REDACTED] in DV360."). Note also that these price analyses relate to pricing for advertisements, not pricing for ad tech.



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way of analogy, just because the price of one rental property is higher than another rental property does not mean that a real estate investor would prefer to invest in the lower priced property. That different types of ad formats may have different price distributions does not mean that these ad formats are in separate product markets.<sup>281</sup>

*d. Professor Gans Ignores Other Brown Shoe Factors that Also Do Not Support His Artificially Narrow Markets*

221) Professor Gans provides no explanation for why he ignores the remaining four *Brown Shoe* factors. Had he considered the remaining factors, it would have been evident that they also do not support his narrow market definitions. For example, ad-buying tools for open web display ads share customers with tools he excludes from his candidate markets (e.g., ad-buying tools used for direct deals, in-app, CTV, and video advertising, and social media advertising).<sup>282</sup> Similarly, many customers inside Professor Gans' narrow candidate markets for ad exchanges and publisher ad servers also use ad tech to transact and serve video ads, mobile in-app ads, and other display ads that Professor Gans excludes from his candidate markets. That is, his candidate markets do not comprise a set of distinct customers that distinguish his narrow market from a market including other display ads.

222) Moreover, when one looks at the way advertisers in the real-world use buying ad tools, as I do in Section VI.B.2.a below, one observes that advertisers buy large volumes of ads through both

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<sup>281</sup> “However, using price differences as a criterion to define the relevant market is unsound. Recall that ultimately what we are interested in is the extent to which a product exerts a competitive constraint on the other (as expressed by the hypothetical monopolist test), but price differences do not give us any information on this point” (Massimo Motta, *Competition policy: theory and practice*, Cambridge University Press, 2004, available at: [https://danielmorochoruiz.wordpress.com/wp-content/uploads/2015/09/massimo\\_motta\\_competition\\_policy\\_theory\\_and\\_prabookfi-org.pdf](https://danielmorochoruiz.wordpress.com/wp-content/uploads/2015/09/massimo_motta_competition_policy_theory_and_prabookfi-org.pdf), at p. 9).

<sup>282</sup> Recall that tools used by advertisers to buy Professor Gans' narrow definition of display ads allow the same customer to purchase video ads, mobile in-app ads, CTV ads, and direct deals (e.g., “Programmatic Direct”). As discussed in Section VI.B.3.a.i, many of the same advertisers using tools to buy his narrow definition of display ads also use ad-buying tools to purchase ads on social media and walled garden platforms.



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Google Ads and DV360. Hence, customers associated with ad buying tools for “small advertisers” are not a distinct group from customers associated with ad buying tools for “large advertisers.”

223) Further, vendors who offer ad servers, ad exchanges, and ad-buying tools for open web display ads often offer these same ad tools for other digital ad formats and environments.<sup>283</sup> Publishers and advertisers often use these tools to optimize inventory management ad spending, respectively, across these digital ad types.<sup>284</sup> Therefore, Professor Gans’ conclusion that there exist antitrust markets of ad tools specifically for open web display is also inconsistent with the “specialized vendors” Brown Shoe factor.

224) In addition, publisher ad servers, ad exchanges, and ad buying tools for open web display ads appear to be “produced” with the same technology (i.e., software) as the tools used for direct deals and other ad formats.<sup>285</sup> Hence, the absence of “unique production facilities” is an indicator that the relevant antitrust markets should not be so restricted to Professor Gans’ candidate markets.

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<sup>283</sup> See Appendix I.A, Appendix I.B, Appendix I.C.<sup>284</sup> See, e.g., Ghose Report, at ¶101 (“Advertisers use the detailed, real-time measurement metrics available through digital advertising to measure the effectiveness of their advertising enabling them to reallocate their advertising budgets more efficiently and in real time across different types of advertising formats, devices, and properties.”).

<sup>284</sup> See, e.g., Ghose Report, at ¶101 (“Advertisers use the detailed, real-time measurement metrics available through digital advertising to measure the effectiveness of their advertising enabling them to reallocate their advertising budgets more efficiently and in real time across different types of advertising formats, devices, and properties.”).

<sup>285</sup> In this context, “produced with software” means that software is the main building block of the ad tools which enable programmatic advertising. See, e.g., Amazon Ads, “Programmatic advertising,” available at: <https://advertising.amazon.com/blog/programmatic-advertising>. Accessed July 26, 2024. (“Programmatic advertising uses workflow automation and machine learning algorithms to deliver the most effective ads to audiences based on a variety of signals, like shopping patterns ... A demand-side platform (DSP) is programmatic software for advertisers. A DSP helps facilitate media buying from numerous publishers through SSPs, ad exchanges, ad networks, and direct integrations ... A supply-side platform (SSP) is programmatic software for publishers to facilitate sales of advertising impressions via ad exchanges. By connecting publishers with multiple ad exchanges, demand-side platforms, and networks at once, SSPs let suppliers sell impressions to a greater pool of potential buyers, and allows suppliers to set the bidding range to maximize their revenue.”).

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225) Finally, the factor “sensitivity to price changes,” when applied correctly, embraces the HMT.<sup>286</sup> As discussed in the next section, Professor Gans does not analyze any actual evidence of user switching patterns, nor does he calculate the cross-price elasticity of demand across potential substitute products.

226) In summary, Professor Gans misapplies three *Brown Shoe* factors and ignores four *Brown Shoe* factors in reaching its conclusions for the relevant antitrust markets. Consideration of these factors suggests that Professor Gans’ *Brown Shoe* analysis does not properly define his candidate relevant antitrust markets. In fact, the *Brown Shoe* factors support a market definition that is broader than his candidate markets based on his narrow definition of display ads, and includes at the very least tools for buying and selling all of the display ad formats and transaction types that may be transacted using Google Ads, DV360, AdX, and DFP that he excludes (e.g., video, mobile in-app ads, and direct deals).

**2. Professor Gans Does Not Apply the Hypothetical Monopolist Test to Properly Define Any Relevant Market**

227) Professor Gans purports to employ the Hypothetical Monopolist Test to bolster his *Brown Shoe* analysis but does not actually apply that methodology—or any methodology—to reach his conclusions.<sup>287</sup> His test bears no resemblance to an actual HMT and appears to be nothing more than his

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<sup>286</sup> Herbert Hovenkamp, “Antitrust Market Definition: the Hypothetical Monopolist and Brown Shoe,” *Network Law Review*, April 4, 2024, available at: <https://www.networklawreview.org/hovenkamp-market-definition/>. (“*Brown Shoe* did mention one factor that seems correct, and that is ‘sensitivity to price changes.’ It said nothing about how such sensitivity should count, but the intuition is a good one. If the demand for one good is very sensitive to the price of another good (and in the same direction), they are more likely to be in the same market. That particular factor, if applied correctly, actually embraces the HMT.”).

<sup>287</sup> Gans Report, at ¶157 (“Based on my application of the HMT or hypothetical monopolist test, a small increase in the price of publisher ad servers above competitive levels would not result in significant substitution by open web display publishers to other products. In response to an increase in price, publishers have two potential options.”). Gans Report, at ¶192-194. (“A relevant market for the transaction of indirect open web display advertising exists if either publishers or advertisers lack sufficient substitutes because under either circumstance, such that a monopolist that owns all the ad exchanges could profitably raise prices by a SSNIP. Moreover, the

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subjective opinions about substitutability. An HMT requires that one estimate how customers respond to price changes.<sup>288</sup> Yet, for each of his candidate relevant markets, Professor Gans never defines a SSNIP, the competitive baseline price from which a SSNIP is calculated,<sup>289</sup> nor provides any measures of diversion among products in response to a SSNIP or an analysis of whether any diversion would render a SSNIP unprofitable.<sup>290</sup>

228) Professor Gans does not describe or analyze any actual evidence of customer preferences, such as customer multihoming or substitution patterns, nor does he calculate the cross-price elasticity of demand—a standard economic measure of the effect of a change in price for one product on the demand for another product<sup>291</sup>—across potential substitute products. Professor Gans’ HMT thus lacks a sufficient

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customer group with the least substitution options will pay the majority of the take rate, because they are less elastic to prices. The economics of tax incidence governs what portions of the take-rate are, economically, paid by publishers as opposed to advertisers. Publishers directly pay a take-rate for the ad exchange service. If the take-rate were to increase by a SSNIP, publishers would likely not switch to other methods of selling their ad inventory. The alternatives facing publishers are not close substitutes to service ad exchanges offer publishers offering to place open web display ads.”). Gans Report, at ¶237 (“A small increase in the price of ad-buying tools for small advertisers for buying open web display advertising above competitive levels would not result in significant substitution by small advertisers for other products.”). Gans Report, at ¶288. (“Based on the same approaches (e.g., Brown Shoe and HMT) and for the same reasons that I evaluated above to find a relevant market for ad buying tools for small advertisers for the buying of open web display advertising space, I also find a complementary market for large advertising tools purchasing open web display advertising. My analysis regarding small advertiser ad buy tools applies equally here.”).

<sup>288</sup> In a 2010 paper, Joseph Farrell and Carl Shapiro state that “[a]ny method of implementing the hypothetical monopolist test must estimate how customers respond to price changes.” The two authors write that diversion ratios—i.e., the percentage of sales captured by different substitute products when the price of a product rises by a SSNIP—might be estimated by using ordinary course business documents that track who a firm loses business to, or who a firm can win business against, customer surveys, information about customer switching patterns, and econometric methods. (Joseph Farrell and Carl Shapiro, “Antitrust Evaluation of Horizontal Mergers: An Economic Alternative to Market Definition,” *The B.E. Journal of Theoretical Economics*, Vol. 10, Issue 1, 2010, at pp. 15-16).

<sup>289</sup> Professor Gans claims that “[t]he HMT must be undertaken carefully where a firm already has monopoly power and prices are elevated above competitive levels.” (Gans Report, at ¶129). However, he has not attempted to calculate what level of prices would prevail in his hypothetical “competitive levels.”

<sup>290</sup> Such methods are available for multi-sided markets and require careful consideration of indirect network effects. *See* David S. Evans and Michael Noel, “Defining Antitrust Markets when Firms Operate Two-Side Platforms,” *Columbia Business Law Review*, Vol. 2005, No. 3, 2005, pp. 667-701, at p. 700.

<sup>291</sup> Product A’s cross-price elasticity with another product B’s price refers to the percentage change in demand for A brought about by a one percent change in the price of product B. Note that cross-price elasticities are not typically symmetric. *See, e.g.*, Edwin Mansfield, *Microeconomics*, Edition 8, W.W. Norton & Company, Inc., 1994, at pp. 125-126. (“[T]he cross elasticity of demand is the relative change in the quantity of good X resulting from a 1 percent change in the price of good Y...For example, goods X and Y may be substitutes, but the consumption of good X may be more sensitive to changes in the price of good Y than the consumption of good Y is to price changes of good X”).

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economic basis for defining relevant markets, as he has not established the extent to which customers will change their consumption of the products in the purported relevant markets in response to a price change. Even if one ignores constraints arising from both integration and the multi-sided nature of transactions—but merely accounts for the economic fact that the demand for his “tools” are derived demands—his markets are too narrow because customers can and do substitute to display ads he excludes. I discuss this economic evidence in Section VI.B.3.

*a. Professor Gans Has Not Properly Defined Relevant Markets for Ad Buying Tools*

229) With respect to his HMT applied to his candidate market for “ad-buying tools for small advertisers,” Professor Gans asserts that “[a] small increase in the price of ad-buying tools for small advertisers for buying open web display advertising above competitive levels would not result in significant substitution by small advertisers for other products.”<sup>292</sup> Yet, Professor Gans never defines what the competitive level of pricing is, the level of price increase he applied to measure substitution, provides any measure of prices at all, nor provide any measurement of substitution.

230) With respect to his candidate market for “ad buying tools for large advertisers,” Professor Gans merely asserts that he used an HMT and concludes: “My analysis regarding small advertiser ad buy tools applies equally here.”<sup>293</sup> Yet, Professor Gans never defines what the competitive level of

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<sup>292</sup> Gans Report, at ¶237.

<sup>293</sup> Gans Report, at ¶288 (“Based on the same approaches (e.g., Brown Shoe and HMT) and for the same reasons that I evaluated above to find a relevant market for ad buying tools for small advertisers for the buying of open web display advertising space, I also find a complementary market for large advertising tools purchasing open web display advertising. My analysis regarding small advertiser ad buy tools applies equally here.”).

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pricing is, the level of price increase he applies to measure substitution, provide any measure of prices at all, nor provide any measurement of substitution.

231) In particular, Professor Gans fails even to provide any measure of substitution between his candidate markets for small advertiser buying tools and large advertiser buying tools. Such an analysis underscores why separate relevant antitrust markets for large advertiser buying tools and small advertiser buying tools are inconsistent with data and commercial realities. Professor Gans not only ignores that ad agencies mitigate his artificial barriers, as I have already explained, he fails to test his buying tools markets against data.

232) First, data do not support Professor Gans' assertion that Google Ads is a buying tool for "small advertisers" and DV360 is a buying tool for "large advertisers."<sup>294</sup> Data indicate that [REDACTED] of advertisers on DV360 spend under [REDACTED] per month.<sup>295</sup> Data indicate that almost [REDACTED] of ad spend on Google Ads is from advertisers spending more than [REDACTED] a month.<sup>296</sup> Because advertisers spending both large and small amounts can and do utilize both Google Ads and DV360—and small

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<sup>294</sup> Gans Report, at ¶110 ("A DSP, however, places that responsibility on the advertiser and larger and more sophisticated advertisers may prefer having that control. DSPs are usually referred to as ad buying tools for large advertisers. Advertisers with a limited advertising budget, who may find it difficult to win bids for an ad space through the ad exchange, can utilize ad buying tools for small advertisers to connect with publishers who can reach the advertiser's target audience."). Moreover, Plaintiffs claim that "[t]he two different types of ad buying tools are also sold at different price levels. DSPs usually require high minimum monthly spend commitments, sometimes [REDACTED] or more, whereas ad buying tools for small advertisers can require just a few dollars to get started." (Fourth Amended Complaint, at ¶73). Plaintiffs also claim that "buying tools for large advertisers usually require dedicated and specialized teams to manage; also, they typically require high minimum spend requirements. By contrast, Google's small advertiser buying tool (Google Ads) has thousands of small advertisers in the United States spending several hundred dollars or less a month on display. These advertisers' monthly spend falls far short of the high minimum monthly spend requirements for using the enterprise buying tools for large advertisers." *See* Fourth Amended Complaint, at ¶171.

<sup>295</sup> *See* Figure 17. I use a [REDACTED] per month threshold because Plaintiffs allege that "[t]he two different types of ad buying tools are also sold at different price levels. DSPs usually require high minimum monthly spend commitments, sometimes [REDACTED] or more, whereas ad buying tools for small advertisers can require just a few dollars to get started." *See* Fourth Amended Complaint, at ¶73.

<sup>296</sup> *See* Figure 18.

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advertisers may also use ad agencies to overcome minimum spend thresholds—data do not support separate ad-buying tool antitrust markets based on “sizes” of advertisers.

233) Second, advertisers frequently buy ads through both Google Ads and DV360; data indicate that advertisers frequently multi-home across these buying tools. In Section VI.B.3 below, I find in Google data that more than [REDACTED] advertisers who purchase narrow display ads on Google Ads and DV360 account for approximately [REDACTED] of Google Ads narrow display ad spend. This is inconsistent with there being distinct buying tool markets for “small” and “large” advertisers.<sup>297</sup>

234) Third, while only [REDACTED] of advertisers on Google Ads spend more than [REDACTED] per month on the platform, they account for almost [REDACTED] of ad spend on Google Ads.<sup>298</sup> Because these advertisers account for such a large percentage of Google Ads ad spend, a SSNIP imposed in Professor Gans’ market for small advertiser buying tools that causes even a small amount of diversion from these “large” advertisers with significant Google Ads ad spend would be unprofitable—even assuming, as Professor Gans asserts, that small advertisers do not have good substitutes for Google Ads.

*b. Professor Gans Has Not Properly Defined a Relevant Market for Ad Exchanges*

235) With respect to his candidate ad exchange market, Professor Gans asserts that “[i]f the take-rate were to increase by a SSNIP, publishers would likely not switch to other methods of selling their ad inventory.”<sup>299</sup> Yet, Professor Gans does not define what the competitive level of pricing is, the level of

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<sup>297</sup> Figure 19 and Figure 20 demonstrate the various “outside” channels that advertisers using DV360 to purchase narrow display ads also participate in, including small advertiser buying tools, direct deals, apps, and video ads.

<sup>298</sup> See Figure 18.

<sup>299</sup> Gans Report, at ¶194.

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price increase he applied, provide any examination of prices, or provide any measurement of substitution. Although Professor Gans acknowledges the importance of user substitution in his theory of harm to innovation,<sup>300</sup> he completely ignores users when defining his candidate markets. More specifically, his HMT ignores that a SSNIP on publishers would, in his words, reduce their “ability to invest in content and innovation,” and result in content viewers receiving “less relevant information.” This, as a matter of economics, would drive users—and hence, through indirect network effects, advertisers and publishers—to substitute to social media, mobile apps, walled gardens, or even to paid “subscriptions... [or] pay walls.”

236) With regard to substitution, Professor Gans merely asserts that publishers have only two alternatives to ad exchanges. He says that “[t]he first potential option would be for publishers to stop monetizing their ad inventory on their web properties [...] this would result in significant losses for publishers and is not a reasonable substitute. Publishers would also not be able to switch to other monetization models, such as subscription-based models.”<sup>301</sup> He also examines the superficial differences between direct deals and programmatic display advertising, and ad exchanges and publisher ad servers and ad networks, but again provides no evidence of publisher substitution patterns in response

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<sup>300</sup> “As a result of being forced to pay a higher take rate, publishers’ *ability to invest in content and innovation* is reduced. This adversely affects publishers’ content quantity and quality. It also makes publishers more reluctant to generate free content. Moreover, because publishers’ profits are reduced, entry into publishing is impeded. Lower publisher quality, entry, and innovation harms *end user* [sic] who receive *less relevant information or are forced to buy subscriptions or navigate pay walls to obtain desired content*.” (Gans Report, at ¶¶888-889, emphasis added).

<sup>301</sup> Gans Report, at ¶195.

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to an increase in price above the competitive level.<sup>302</sup> Thus, he summarily concludes that a “hypothetical monopolist would still be able to profitably increase the exchange take-rate.”<sup>303</sup>

237) However, this is a false dichotomy: publishers can and do monetize content through alternatives such as direct deals and ad networks, which Professor Gans summarily discards. Exhibit 11 shows that direct deals and ad networks (AdSense) accounted for about [REDACTED] of publishers’ impressions through DFP in 2022. These impressions do not involve ad exchanges, and a hypothetical monopolist that imposes a SSNIP on ad exchanges for narrow display ads would risk losing more sales to these alternatives.<sup>304</sup> Moreover, some publishers have developed in-house substitutes to serve their programmatic ad sales needs.<sup>305</sup> Plaintiffs have not examined whether the ability of some publishers to self-supply would constrain a hypothetical monopolist over ad exchanges.

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<sup>302</sup> Gans Report, at ¶¶199-223 (The section titles for this portion include, “Direct transactions are not in the relevant product market for indirect open web display advertising ad exchange,” “Other ad tech tools such as networks and publisher ad servers are not participants in the relevant product market for indirect open web display advertising ad exchange.”). *See also* Gans Report, at ¶212 (“The relevant market for ad exchanges for transacting indirect open web display advertising does not include other products that do not provide an exchange’s functionalities.”)

<sup>303</sup> Gans Report, at ¶198.

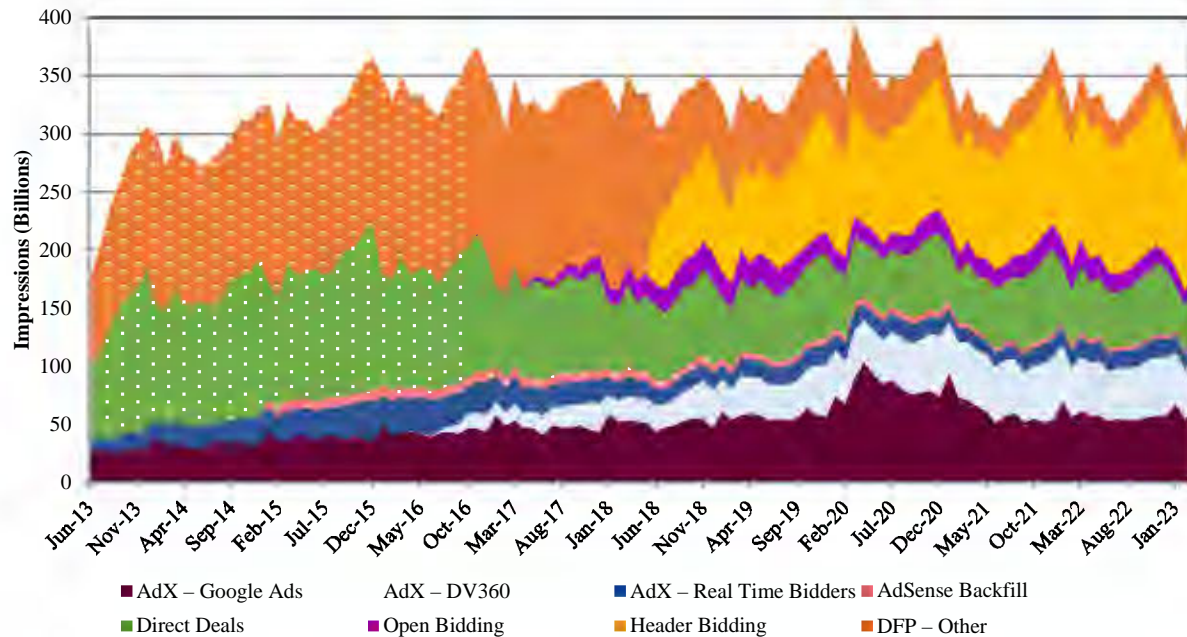
<sup>304</sup> Similarly, Professor Simonson’s survey implies that a large percentage of advertisers would substitute to direct deals and ad networks in response to an advertiser-facing SSNIP over ad exchange transactions for open web display ads. Because buying ads through direct deals and ad networks do not involve an ad exchange, any SSNIP inside Professor Gans’ ad exchange market that adversely impacts advertisers would likely be unprofitable.

<sup>305</sup> GOOG-AT-DOJ-DATA-000066787 (eMarketer data). [REDACTED] of 2022 U.S. display ad spending was accounted for by [REDACTED] (non-Google) companies with their own in-house ad servers: [REDACTED].



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**Exhibit 11**  
**Impressions on DFP for Display Ads (Narrow) Plus Direct Deals Viewed by U.S. Users**  
**Excluding House Ads**  
**June 2013 – March 2023**



Notes: The dotted shading on DFP and AdSense impressions respectively indicates limited availability of precise mobile app indicators in the DFP Reservations data and of precise ad format indicators in the AdSense backfill data.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

238) Even if it were true that “publishers do not have reasonable substitutes for ad exchanges,”<sup>306</sup>

Professor Gans’ assertion that a SSNIP would be profitable solely on that basis ignores the impact of indirect network effects on the choices of advertisers, publishers and users. As discussed in Section V.F.5 and Section VI.A.2, an increase in the price of ad exchanges does not merely cause advertisers to pay more for or publishers to earn less from display ads. Owing to feedback effects, the price increase incentivizes advertisers to pursue better returns on their ad spend away from exchanges and/or depresses

<sup>306</sup> Gans Report, at ¶198 (“[P]ublishers do not have reasonable substitutes for ad exchanges. This means that even if advertisers were perfectly elastic (i.e., had perfect substitutes for ad exchanges), a hypothetical monopolist would still be able to profitably increase the exchange take-rate.”).

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publisher investment in web content, which in turn drives fewer visits from users in a cycle that inflicts more and more lost sales on the hypothetical monopolist. Because users already cross-visit, and advertisers already use tools and platforms, “outside” of Professor Gans’ candidate markets (e.g., Facebook, Amazon, video and mobile apps),<sup>307</sup> switching costs for advertisers and users are very low. Due to the feedback effects discussed above, even modest shifts of ad spend outside of Professor Gans’ candidate markets could cause additional diversion that would likely make a SSNIP unprofitable.<sup>308</sup> However, Professor Gans does not address these effects and therefore has conducted an incomplete market definition analysis.

*c. Professor Gans Has Not Properly Defined a Relevant Market for Ad Servers*

239) Professor Gans asserts that his HMT applied to his candidate publisher ad server market finds that “a small increase in the price of publisher ad servers above competitive levels would not result in significant substitution by open web display publishers to other products.”<sup>309</sup> Yet, Professor Gans never defines what the competitive level of pricing is, the level of price increase he applied to measure substitution or provide any measurement of substitution. His opinion, which he incorrectly characterizes as being based on an HMT, appears to solely rest on his unsupported assertion that publishers like the New York Times would be “highly unlikely” to eliminate all digital advertising from their content or

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<sup>307</sup> Advertisers also buy display ads through direct deals and ad networks, which Plaintiffs’ narrow candidate ad exchange market excludes.

<sup>308</sup> These feedback effects do not depend solely on substitution. To the extent the SSNIP reduces the quality of ads that internet users see on publishers’ websites, internet users may respond in ways that reduce the number or value of impressions sold, regardless of their cross-visitation patterns. This may occur through, e.g., increased use of ad blocking providers such as AdBlockPlus, which allows users to “[s]urf the web with no annoying ads” for free. (AdBlockPlus, “Surf the web with no annoying ads,” available at: <https://adblockplus.org/>. Accessed July 31, 2024).

<sup>309</sup> Gans Report, at ¶157.

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build in-house serving capabilities.<sup>310</sup> His further conclusions that neither “in-house tools” nor “in-app mediation tools” are in the relevant market are not based on any analysis of the extent to which publishers substitute away from publisher ad servers in response to a SSNIP.<sup>311</sup>

240) Professor Gans’ publisher ad server market includes only publishers’ use of ad servers for websites. However, data and documents indicate that many publishers using ad servers for websites also manage ad inventory related to mobile apps, video ads, and connected TV with the very same ad servers.<sup>312</sup>

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<sup>310</sup> Gans Report, at ¶¶158-160 (“The first option would be for publishers to stop selling or monetizing their ad inventory on their web properties. This would result in significant losses. For example, a large publisher such as The New York Times has over 9.7 million digital-only subscribers. It attributes 20.8% of revenue to advertising, with 62.9% of that, roughly \$318MM, generated through digital advertising in 2023. It is highly unlikely a 5% price increase in the market for publisher ad server used for the sale of open web display advertising would cause the publishing giant to eliminate digital advertising from its content. For publishers who do not have other selling or monetization channels as part of their current businesses, creating those new channels would involve a significant cost. For instance, charging users for content or taking out paid subscriptions would require changing their relationship with those users who are currently used to content that was freely available. Publishers would need to convince their user base to pay for content that was previously free; something users are often reluctant to do. Publishers would risk losing significant revenue generation and a large portion of their user base. A second response to a SSNIP would be to build in-house serving capabilities to replace the publisher ad server. Building and maintaining in-house tools is more costly than a SSNIP. It requires significant financial investments in terms of infrastructure and personnel and are, thus, not a reasonable substitute.”).

<sup>311</sup> Gans Report, at ¶¶161-177. *See, e.g.*, Gans Report, at ¶165 (“In-house tools are publisher ad servers that publishers build rather than license from a third party. Building an in-house tool is challenging, requiring technological expertise. For most publishers, in-house tools are not an option for managing their ad inventory. In-house tools are usually only accessible to large publishers specialized in social advertising, video advertising, or large retailers.”). *See also* Gans Report, at ¶173. (“As I explained above, the large majority of publishers using publisher ad server used for the sale of open web display advertising are solely monetizing open web display inventory. In contrast, publishers that have a large majority of in-app inventory usually use mediation tools, that are specifically intended for in-app monetization, rather than publisher ad servers used for the sale of open web display advertising.”). Moreover, Professor Gans asserts that “only mediation (in-app ads) and direct deals are not under the unified floor constraint (the different treatment of which further show why such inventory is not in the relevant markets).” (Gans Report, at ¶482). He concludes that this is further evidence that the relevant market is limited to open web ads. This conclusion is wrong, because the central question of market definition is whether customers could defeat putative harm by diverting towards other products.

<sup>312</sup> For example, the share of publishers in Professor Gans’ candidate market that sell video ads has increased from around [REDACTED] to around [REDACTED] in 2023. *See* Figure 21. I note that this figure treats direct deals the same as indirect sales to evaluate the extent to which publishers are well positioned to substitute away from the ad formats that Professor Gans excludes from his narrow definition of display ads. A publisher that sells inventory for video ads can do so through indirect or direct means as the ad server can switch between these transaction types automatically to optimize the publisher’s revenue (such as is the case under, e.g., Google’s Enhanced Dynamic Allocation).

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241) Data show publishers that use DFP for serving display ads (narrow) typically allocate ad inventory across a variety of media channels and formats.<sup>313</sup> Data indicate that almost [REDACTED] of publishers that are “inside” the candidate market for ad servers also use options that Plaintiffs exclude from their narrow definition of ad servers for display ads, including ad servers for video ads and mobile in-app ads.<sup>314</sup> Data also show growth in video ad impressions served by publishers who multi-home in Plaintiffs’ narrow definition of display ads. Because many publishers can and do use video ads, it is at least plausible that a SSNIP<sup>315</sup> on Plaintiffs’ narrow market for publisher ad servers for display ads would be unprofitable.

242) In addition to ignoring the constraints arising from indirect network effects (as discussed above), Plaintiffs ignore constraints stemming from publishers’ diverse and dynamic approaches to monetizing their content. Publishers that utilize ad servers to manage their display ad inventory are heterogeneous in their reliance on ad revenue from Professor Gans’ narrow definition of display advertising. Publishers can and do substitute to other means of content monetization, including subscription fees and/or paywalls.<sup>316</sup> Because publishers can and do use other means of monetizing their

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<sup>313</sup> For example, the number of video ad impressions sold by publishers who also sell Professor Gans’ narrow definition of display ads has increased from about 7 billion in January 2017 to 29 billion in March 2023. *See* Figure 22. I note that this figure treats direct deals the same as indirect sales to evaluate the extent to which publishers are well positioned to substitute away from the ad formats that Professor Gans excludes from his narrow definition of display ads. A publisher that sells inventory for video ads can do so through indirect or direct means as the ad server can switch between these transaction types automatically to optimize the publisher’s revenue (such as is the case under, e.g., Google’s Enhanced Dynamic Allocation).

<sup>314</sup> *See* Figure 23.

<sup>315</sup> I note that, because free, open source ad servers are available, a hypothetical monopolist here cannot actually be “the only present and future seller of” ad servers. *See* Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at pp. 41-42. Examples of free, open source ad serving technology include Revive ad server and Pre-bid ad server. *See* Revive, “Revive Adserver,” available at: <https://www.revive-adserver.com/>. Accessed August 6, 2024; Prebid, “Boost Programmatic Advertising Revenue,” available at: <https://prebid.org/>. Accessed August 2, 2024.

<sup>316</sup> For example, Hulu offers a paid, ad-free version where users can watch anything “[f]rom current episodes and original series, to kids shows and hit movies [...] for only \$17.99/month.” *See* Hulu, “Stream Tons of Shows & Movies. Zero Ads,” available at:

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content, it is at least plausible that a SSNIP on Plaintiffs' narrow market for publisher ad servers for display ads would be unprofitable.

243) Finally, many publishers do not use third-party ad servers. Instead, they have developed their own technologies for serving ads in-house.<sup>317</sup> Today, several publishers using third-party ad servers may have the size, technical assets, and financial assets to consider developing an in-house ad server. These same publishers are also the ones with the most to gain from doing so were a SSNIP imposed.<sup>318</sup> As of 2022, [REDACTED] of Google's revenue from U.S. ad serving fees was paid by just [REDACTED]. The size and technical sophistication of these publishers is likely reflected in the volume of impressions attributable to their properties: the top [REDACTED] of DFP publishers account for almost [REDACTED] of DFP impressions, which means they already account for technologies required to render their content on the devices of potentially many millions of users accessing their content on a regular basis. Plaintiffs have not examined whether the ability of large publishers to self-supply would constrain a hypothetical monopolist over ad servers.

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<https://www.hulu.com/no-ads>. Accessed August 2, 2024. SeekingAlpha changed from ad-supported to a subscription-based revenue model. *See* Internet Archive, "Seeking Alpha to end third-party ads on site," available at: <https://web.archive.org/web/20221206213546/https://talkingbiznews.com/they-talk-biz-news/seeking-alpha-to-end-third-party-ads-on-site/>. Accessed August 2, 2024. ("Investing advice site SeekingAlpha.com said Wednesday that it will stop running third-party advertising on its website. Advertising was 70 percent of its revenue at the end of 2019 and is still about 25 percent of its revenue, said CEO David Jackson... 'We're not shutting down ads because they are weak,' he added. 'On the contrary, the ad market is strong right now, and there's a lot of demand from advertisers to reach our audience... We can do this because we are profitable, are generating cash, and can be profitable with subscriptions alone,' he said.").

<sup>317</sup> Many publishers today operate their own ad server. Examples include Disney+ and Hulu, Snapchat, eBay, and LinkedIn. *See* Todd Spangler, "Why Disney Built Its Own Ad Server for Disney+ and Hulu — and What the YODA Does," *Variety*, January 22, 2023, available at: <https://variety.com/2023/digital/news/disney-ad-server-tech-disney-plus-yoda-1235497663/>; Snapchat, "Advertising on Snapchat," available at: <https://forbusiness.snapchat.com/advertising>. Accessed August 4, 2024; Seb Joseph, "How eBay is building server-side ad tech to chase ad budgets," *Digiday*, November 15, 2018, available at: <https://digiday.com/marketing/ebay-ad-budgets-ad-tech-server-side/>; LinkedIn Marketing Solutions, "Get Started with LinkedIn Ads," available at: <https://business.linkedin.com/marketing-solutions/ads>. Accessed August 2, 2024.

<sup>318</sup> Recall that [REDACTED] of publishers pay nothing for using Google's ad server, GAM.

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244) In sum, Professor Gans' SSNIP analyses for the markets he defines are entirely hypothetical, and neither grounded in economic evidence nor analysis of customer preferences. Despite using the terminology of an HMT, Professor Gans never actually performs one as understood in the economics literature. Rather, what Professor Gans characterizes as an HMT test appears to merely be a continuation of his *Brown Shoe* analysis under another name, and thus is similarly speculative and unreliable.

*d. Professor Gans Fails to Apply a Multi-Sided HMT*

245) Professor Gans focuses on four single-sided markets (publisher ad servers, ad exchanges, and ad-buying tools for large and small advertisers). Nonetheless, he acknowledges that these ad tech tools "facilitate the advertising transactions between publishers and advertisers," effectively conceding that it is appropriate to evaluate these tools in a two-sided market context.<sup>319</sup> Professor Gans fails to do so.

246) Professor Gans argues without citing support that it is unnecessary to conduct a different HMT in a multi-sided market because: "[a]s long as *one* side of the market (i.e., the advertiser-side or the publisher-side) has limited substitutes for a given ad tech product, a hypothetical monopolist could

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<sup>319</sup> Gans Report, at ¶132, fn. 101. ("While not all tools in the ad tech stack *directly* interact with both sides of the market (publishers and advertisers), it is still reasonable to consider ad tech tools as bringing the two sides of the market together (i.e., transacting demand from advertisers and supply from publishers). The products in each of the relevant product markets I define (publisher ad servers, ad exchanges, ad buying tools for large advertisers, and ad buying tools for small advertisers) facilitate transactions between publishers and advertisers."). (emphasis in original).

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profitably impose a SSNIP or an equivalent reduction in quality to that one side.”<sup>320</sup> It is well-known that this logic is wrong because it ignores indirect network effects.<sup>321</sup>

247) Professor Gans not only fails to identify the magnitude of a SSNIP in each of his distinct tools markets, but he also has not identified whether the SSNIP applies to advertisers, publishers, or some combination.<sup>322</sup> Because the relevant market in a multi-sided transaction platform considers a SSNIP that potentially changes many different prices, a complete and proper analysis of the profitability of a SSNIP involves assessment of not only (a) standard constraints (e.g., direct substitution), but also (b) indirect network effects and (c) equilibrium substitution by all customer groups on the transaction platform impacted by these indirect network effects.

248) Plaintiffs have not only failed to establish the inability of customers to directly substitute, but also (b) and (c). The economics literature indicates that (b) and (c) can be as large as (or larger than) the direct substitution effects.<sup>323</sup> These effects amplify the reductions in participation from the imposition

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<sup>320</sup> Gans Report, at ¶132 (emphasis added).

<sup>321</sup> David S. Evans, “The Antitrust Economics of Multi-Sided Platform Markets,” *Yale Journal on Regulation*, Vol. 20, 2003, pp. 327-381. I also note that the simple Rochet and Tirole two-sided market model is not appropriate to use in this matter for two reasons. First, it assumes that the presence of more advertisers does not increase the demand by advertisers, and vice versa. Second, it does not account for the adverse indirect network effects arising here as a result of users substituting away from the platform of the hypothetical monopolist. See Jean-Charles Rochet and Jean Tirole, “Platform Competition in Two-Sided Markets,” *Journal of the European Economic Association*, Vol. 1, No. 4, 2003, pp. 990-1029.

<sup>322</sup> By way of example, consider a candidate advertiser buying tool market. A SSNIP imposed purely on advertisers would reduce their ROI, inducing advertisers to substitute to alternative ways of reaching users (e.g., social media or mobile apps), potentially causing the price increase or quality reduction to be unprofitable. Likewise, a SSNIP imposed purely on publishers would induce marginal publishers to monetize content through other means (e.g., mobile apps, direct deals, hosted content on Facebook, etc.). To the extent that publishers cannot substitute, the resulting reductions in the quality of their content would induce users to view content elsewhere and induce marginal advertisers to follow them. Each of these effects tends to reduce the profitability of a SSNIP and Plaintiffs have failed to establish that these direct and indirect effects are small.

<sup>323</sup> See Sung Yoon Yang, “Rethinking Modes of Market Definition for multi-Sided Platforms,” *International Journal of Trade, Economics and Finance*, Vol. 9, No. 4, 2018, pp. 164-169, at p. 165. See OECD, “Rethinking Antitrust Tools for Multi-Sided Platforms,” OECD, 2018, available at: <https://www.oecd-ilibrary.org/docserver/a013f740-en.pdf>, at p. 46. (“Since positive indirect network effects between the different sides of the platform reduce the profitability of any price increase, the risk of applying a one-sided SSNIP test, which does not account for these feedback effects, is that in such cases the two markets may be defined too narrowly.”).



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of SSNIPs as compared with standard notions of “interchangeability” in single-sided markets. In reality, imposing a SSNIP on advertisers in one or more of Plaintiffs’ candidate markets makes the hypothetical monopolist’s platform less attractive to publishers—and vice versa. This leads to direct substitution as well as adverse indirect network effects that lead to feedback effects and further deteriorate advertiser and publisher participation. With fewer advertisements and publishers to match, the quality of advertisements displayed to users deteriorates, and publishers have diminished incentives to invest in developing web content, which translates into a reduction in content viewer participation and attention at publisher websites. These shifts tend to reduce the profitability of imposing a SSNIP on advertisers and/or publishers in Plaintiffs’ candidate markets. In short, Plaintiffs’ conclusions regarding the relevant product markets are unreliable because they ignore these and other constraints that economic theory indicates are essential for determining relevant product markets in multi-sided markets.<sup>324</sup>

***3. Professor Gans Ignores or Inappropriately Discounts Meaningful Competitive Constraints to Define Artificially Narrow Markets***

249) In addition to cherry-picking *Brown Shoe* criteria and misapplying the HMT, Professor Gans’ HMTs suffer from several additional flaws across his candidate relevant markets, each of which renders his opinion unreliable. Professor Gans ignores or inappropriately discounts potential substitution to ad formats he gerrymanders from his relevant market; ignores the potential for marginal (rather than complete) substitution to render a SSNIP unprofitable; and improperly isolates components of the ad

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<sup>324</sup> “[For two sided platforms] the price on each side is a complex function of the elasticities of demand on both sides, indirect network effects, and marginal costs on both sides.” (David S. Evans and Michael Noel, “Defining Antitrust Markets when Firms Operate Two-Side Platforms,” *Columbia Business Law Review*, Vol. 2005, No. 3, 2005, pp. 667-701, at p. 696). Indirect network effects from internet users make this relationship even more complex.



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tech stack, failing to consider both the impact of indirect network effects and vertical integration of the ad tech stack. I discuss each of these flaws below.

*a. Professor Gans Ignores or Inappropriately Discounts Potential Substitution Away from His Narrow Definition of Display Advertising*

250) Professor Gans does not provide any analysis of publishers' and advertisers' willingness to switch (let alone marginally divert spend) between his narrow definition of display ads and the other display ads he excludes from his candidate markets.<sup>325</sup> Instead, Professor Gans defines his candidate markets by reference to features or functionalities associated with open web display ad tech.<sup>326</sup> Professor Gans thus conflates economic substitutability with functional substitutability, relying on the latter rather than the former for defining his relevant markets.<sup>327</sup>

*i. Professor Gans Ignores Multi-Homing and Substitution Outside of His Narrow Candidate Markets*

251) In this section I will show that, in contrast to Professor Gans' approach, data reflect significant multi-homing both by advertisers and publishers "inside" and "outside" of Professor Gans'

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<sup>325</sup> Professor Gans describes a variety of types of ad sales that are included or excluded from his four candidate markets. However, throughout his report he characterizes his candidate relevant markets and presents figures created from data in ways that conflict with the arguments he makes in the market definition section of his report. For example, Professor Gans claims that his candidate markets exclude in-stream and out-stream video ads. (Gans Report, at ¶¶73, 137). However, he includes video ads in his analyses such as his Figures 5, which compares CPM from impressions transacted through Open Auction versus Programmatic Guaranteed in 2021. The figure is generated using MDL RFP 243 AdX data applying the following filters: COUNTRY\_CRITERIA\_ID is used to filter to "2840" (i.e., US); IS\_MOBILE\_APP\_REQUEST is set to be False; and year is restricted to be 2021. MDL RFP 243 AdX data show that in 2021 there are almost 82 billion U.S. video impressions under Open Auction and at least 6 billion U.S. video impressions under Programmatic Guaranteed satisfying Professor Gans filtering criteria.

<sup>326</sup> Gans Report, at ¶¶176-177 (a discussion about in-app mediation tools), 255-258 (a discussion about video ads), and 261-266 (a discussion about in-app ads).

<sup>327</sup> For instance, Professor Gans states the following with respect to display ads and video ads: "Google documents state that 'users are much less tolerant of low-quality ads on video because the ads experience tends to be interruptive. Over the years, experiments have shown that low quality ads, placed at the wrong times tend to lead to increased abandonment of user sessions (reducing watch time on YT [YouTube]) or in the case of non-skippable ads increased adblock install rates.' This is not a concern with display ads." (Gans Report, at ¶257).

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narrow definition of open web display ads. These data suggest substitution to ad formats and channels outside of Professor Gans’ narrow definition of display advertising in response to a SSNIP—in relation to ad buying tools, ad exchanges, or ad servers—is both easy and likely.

252) The large and diverse set of advertising channels used by advertisers stands out as a particularly important constraint on the hypothetical monopolist. Recall that the demand for an ad buying “tool” is a “derived demand.” If advertisers can readily reach their target audiences without using the tool, a hypothetical monopolist is likely to find a SNIPP to be unprofitable because advertisers will use alternative means of reaching audiences. Data indicate that advertisers have numerous options for reaching the target audiences for their ads “outside” of Professor Gans’ narrow candidate buying tool markets for display ads.<sup>328</sup> Users consume content not only in Professor Gans’ narrow framework for display ads, but also on social media, connected TV, apps, and traditional venues like linear TV, radio, and print that are excluded from Professor Gans’ candidate markets.<sup>329</sup> As demonstrated in Section V.F.5, users commonly cross-visit platforms, such as Facebook, that Professor Gans excludes from his candidate markets.

253) Professor Gans completely ignores the important role that users play in advertising. As one FTC economist explained decades ago: “In a fundamental sense, what advertisers demand, and what the

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<sup>328</sup> Additionally, across some of the biggest ad tech companies (Amazon DSP, Google’s DV360, the Trade Desk, and Verizon Media DSP), a wide variety of inventory types beyond Plaintiffs’ narrow definition of display ads are offered: retargeting ads, video ads, mobile app ads, Connected TV ads, Native ads, and Digital Audio ads. (GOOG-DOJ-AT-02524665, at -698).

<sup>329</sup> For instance, the Pew Research Center found that in 2023 over 50 percent of U.S. adults at least sometimes get news from TV and Radio alongside digital devices, and that 37 percent of U.S. adults at least sometimes get news from print publications. (Pew Research Center, “News Platform Fact Sheet,” November 15, 2023, available at: <https://www.pewresearch.org/journalism/fact-sheet/news-platform-fact-sheet/?tabItem=4ef8dece-845a-4b25-8637-ceb3114503c5>.) Figure 24 demonstrates similar behavior with consumers using multiple media channels: 92 percent of U.S. adults use the internet, while 71 percent use subscription video—given these data points, at least 63 percent of the population consumes both internet and subscription video content.

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various advertising media outlets supply, are units of audience for advertising messages. Thus, advertiser demand for space in the print media and time in the broadcast media is a derived demand stemming from a demand for audience, and is a positive function of the size and quality of the audience.”<sup>330</sup> This economist also provides empirical evidence that—even before the digital age—video ads competed with textual ads.<sup>331</sup>

254) Consistent with the cross-visitation patterns of users discussed in Section V.F.5, data indicate that advertisers multi-home “inside” and “outside” of Professor Gans’ candidate markets. More specifically, Exhibit 12 shows that approximately [REDACTED] advertisers used Google Ads between July 2015 and March 2023 to purchase Professor Gans’ narrow definition of display ads. Only [REDACTED] of these advertisers only purchased ads “inside” Professor Gans’ candidate market, while [REDACTED] also purchased types of ads “outside” of his candidate market.<sup>332</sup> Data indicate that the number of Google Ads advertisers who buy ads “inside” and “outside” Professor Gans’ candidate market for small advertiser buying tools has dramatically increased over the last decade and, today, nearly all advertisers using Google Ads do so.<sup>333</sup> These patterns indicate that the vast majority of advertisers are well-positioned to divert some or all of their ad spend away from Professor Gans’ narrow candidate market

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<sup>330</sup> James M. Ferguson, “Daily newspaper advertising rates, local media cross-ownership, newspaper chains, and media competition,” *The Journal of Law and Economics*, Vol. 26, No. 3, 1983, pp. 635-654, at p. 637.

<sup>331</sup> “An increase in the number of broadcast stations in the city is associated with significantly lower [...newspaper] advertising rates.” (James M. Ferguson, “Daily newspaper advertising rates, local media cross-ownership, newspaper chains, and media competition,” *The Journal of Law and Economics*, Vol. 26, No. 3, 1983, pp. 635-654, at p. 651).

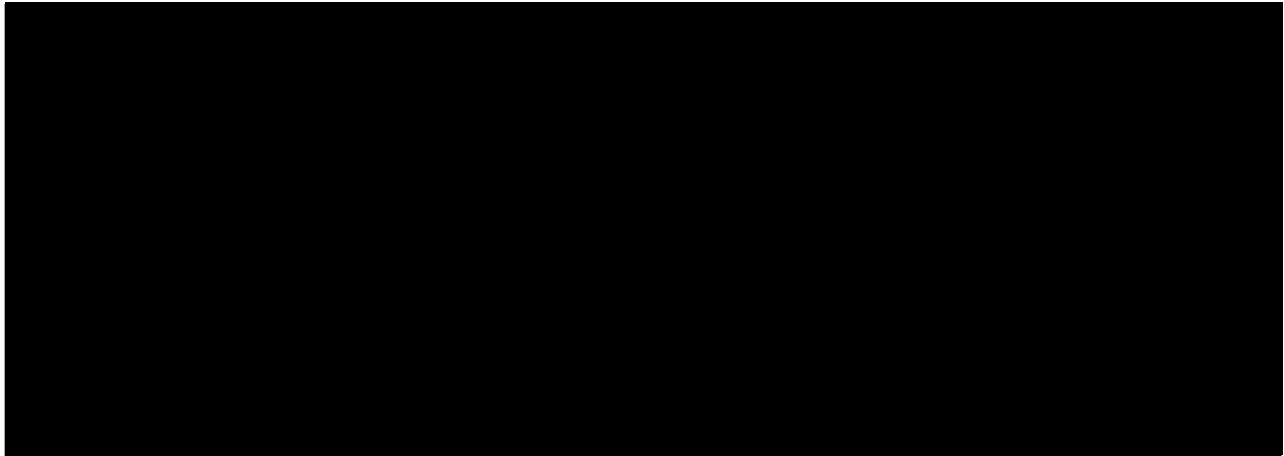
<sup>332</sup> As this exhibit uses only data from Google Ads and DV360 in production, it does not include advertisers’ spend on a variety of other types of ads (e.g., print ads) and ads purchased on other platforms (e.g., social media).

<sup>333</sup> See Figure 25. See also Figure 26, which shows ad spending trends across different channels for advertisers who purchase display ads (Narrow) through Google Ads. As this figure uses only data from DV360 and Google Ads in production, it does not include advertisers’ spend on a variety of other types of ads (e.g., search) and ads purchased on other platforms (e.g., social media).

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and towards outside options.<sup>334</sup> Therefore, it is highly unlikely that a hypothetical monopolist could profitably impose a SSNIP inside Professor Gans' narrow candidate market for small advertiser buying tools.<sup>335</sup>

**Exhibit 12**



Notes: Outside channels include ads purchased on a small advertiser buying tool (Google Ads) that are not narrow display ads, as well as ads purchased on a large advertiser buying tool (DV360.) Advertisers are considered to be using an outside channel if greater than 0.5 percent of their total ad spend is on such a channel.

Source: MDL DV360 XBridge Data; MDL RFP 243 Google Ads Data.

255) Similarly, as shown in Exhibit 13, about [REDACTED] of advertisers using Google's "large advertiser buying tool" (DV360) to purchase Professor Gans' narrow definition of display ads also purchase ads "outside" Professor Gans' candidate market.<sup>336</sup> If advertisers were subjected to a SSNIP in

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<sup>334</sup> There exist a variety of substitution options as well as multi-homing inside and outside the candidate markets that occurs today. These options include contracting directly with publishers via direct deals and shifting ad spend to alternative ad formats and/or environments (such as in-app, video, connected TV, and social media). Figure 26 shows that the volume of ad spend on video through Google Ads, for example, has grown since 2015.

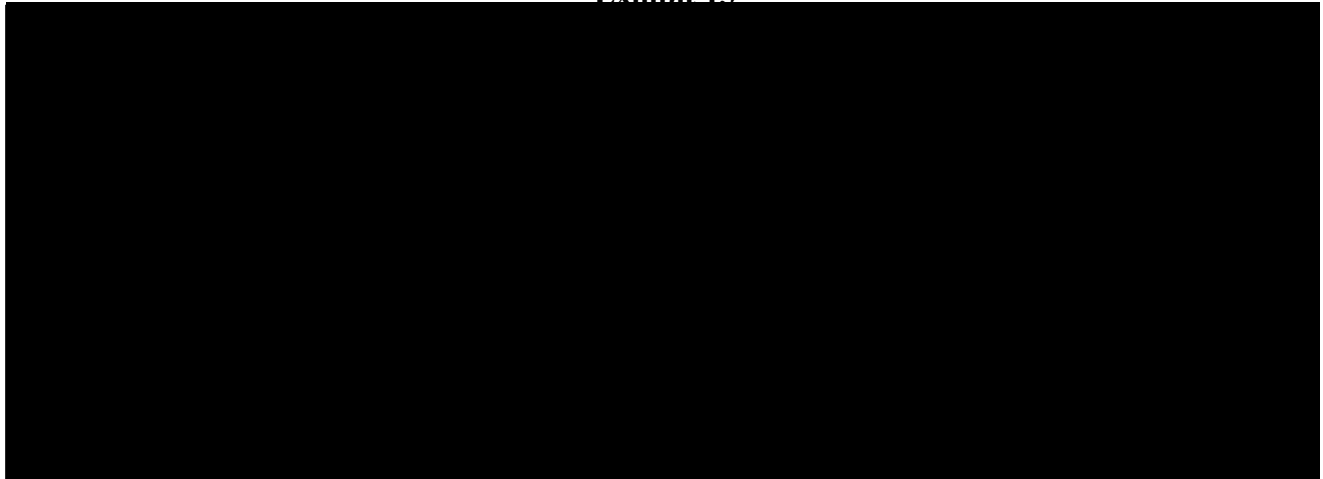
<sup>335</sup> I note that the economic mechanism that induces advertisers to divert some or all spend away from Professor Gans' narrow candidate market is the ROI that advertisers observe on their ad spend. More specifically, a marginal increase in price reduces advertisers' ROI and would plausibly induce some advertisers to divert a portion of their ad spend "inside" the candidate market to one or more "outside" options.

<sup>336</sup> Figure 27 shows ad spending trends across different channels for advertisers who purchase display ads (Narrow) through DV360. As this figure uses only data from DV360 and Google Ads in production, it does not include advertisers' spend on a variety of other types of ads (e.g., search) and ads purchased on other platforms (e.g., social media).

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either “small advertiser buying tools” or “large advertiser buying tools” for Professor Gans’ narrow definition of display advertising, advertisers could use these same buying tools to substitute to ad types outside Professor Gans’ candidate market, disciplining the attempted price increase. Indeed, these tools already include features that shift advertisers’ ad spend budgets across image-based ads on websites, in-app ads, video ads on websites, and other ads to seek out the most effective deployment of their advertising dollars.<sup>337</sup>

**Exhibit 13**



Notes: Outside channels include ads purchased on a large advertiser buying tool (DV360) that are not narrow display ads, as well as ads purchased on a small advertiser buying tool (Google Ads.) Advertisers are considered to be using an outside channel if greater than 0.5 percent of their total ad spend is on such a channel.

Source: MDL DV360 XBridge Data; MDL RFP 243 Google Ads Data.

256) Survey results on advertisers and agencies conducted by Professor Simonson are consistent with my independent data analyses and conclusion that Professor Gans’ candidate markets are too

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<sup>337</sup> Examples of these types of campaigns include Target ROAS and Performance Max campaigns on Google Ads. (Google Ads Help, “About Target ROAS Bidding,” available at: <https://support.google.com/google-ads/answer/6268637>. Accessed August 4, 2024; Google Ads Help, “Upgrade Your Display campaigns to Performance Max Campaigns,” available at: <https://support.google.com/google-ads/answer/13451710>. Accessed August 4, 2024).

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narrow.<sup>338</sup> Similar to actual data, Professor Simonson's survey results show that approximately 85 to 87 percent of advertisers and ad agencies multi-home using display ads<sup>339</sup> with advertising types Professor Gans excludes from his candidate markets.<sup>340</sup> For example, among the small advertisers who have purchased display ads, 66 percent multi-home with social ads, 59 percent multi-home with video, and 34 percent multi-home with in-app ads.<sup>341</sup> Professor Simonson's survey finds that 77 percent of the large advertisers multi-home using display with social Ads, 64 percent multi-home with Digital Video, and 43 percent multi-home with In-App Ads.<sup>342</sup> His survey also shows that 77 percent of the ad agencies multi-

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<sup>338</sup> In his report, Professor Simonson states: "[T]he surveys described in this report are designed to provide a broad review of actual decisions and considerations, as well as their expected responses to changes in the cost or performance of a particular type of advertising. [...] the primary focus of my assignment was on display ads and programmatic display ads in particular. However, because display advertising cannot be properly examined without considering the range of advertising types available to and used by advertisers, the surveys also asked respondents about the range of advertising types they use and the impact, if any, of a change in one component (e.g., the cost of programmatic display advertising increases by a small but significant amount) on decisions pertaining to other advertising types." See Simonson Report, at ¶20.

<sup>339</sup> Simonson Report, at Figure 4. In his report, Professor Simonson states: "As described in more detail below, 'display advertising' was defined to these survey participants as: 'digital ads made up of text, image, video, and/or other multimedia components that typically appear along the top or sides of a website, or sometimes in the middle of other content on a website. Examples of display ad formats include banner ads, animations, and interactive content. Display ads do not include ads placed on social media platforms.' As described below in paragraph 52, these definitions were created for purposes of these surveys only, in order to test—among other things—the degree to which advertisers viewed certain types of ads, including ads placed on social media platforms, as substitutes for other types of display ads. I did not conduct a survey to determine how advertisers use the terms 'display' or 'social.' In the Higher-Spend Advertiser Survey and Agency Survey, 'programmatic ads' were defined as: 'ads that...are transacted and fulfilled using automation. In programmatic transactions, the price of each impression is typically determined in an auction conducted automatically before the impression is served.' As discussed in more detail below, because lower-spend advertisers might not regularly differentiate between programmatic and direct deals transaction methods, I did not refer to programmatic ads and instead asked about display advertising more generally in the Lower-Spend Advertiser Survey." See Simonson Report, at fn. 4.

<sup>340</sup> Figure 28 reproduces Figure 4 from Professor Simonson's report. In his report he states: "The survey results demonstrate that most advertisers and ad agencies tend to multi-home across different types of digital advertising and, within display advertising, through the use of multiple ad buying tools and platforms." See Simonson Report, at ¶18. Anecdotally, Google as an advertiser exhibits this very phenomenon, with the bulk of its own advertising dollars in 2023 split between in-app, video, traditional television, other digital (e.g., email campaigns), and print ads in addition to display ads. See Figure 29. Broader data exhibit similar themes. Figure 30 shows that advertisers purchasing display ads (narrow) also seek content viewers' attention through other media channels and formats, including traditional forms of advertising (e.g., television, newspaper, radio, etc.). 56 percent of advertisers "inside" the candidate market purchased both digital ads and traditional ads.

<sup>341</sup> Figure 31 and Figure 32 reproduce Appendix Exhibit 44 and Appendix Exhibit 45 from Professor Simonson's Report.

<sup>342</sup> Figure 33, Figure 34, and Figure 35 reproduce Appendix Exhibit 8, Appendix Exhibit 9 and Appendix Exhibit 10 from Professor Simonson's report. Figure 33 shows that the total number of respondents who selected Display Ads corresponds to 453. Moreover, Figure 35 shows that 57 percent of large advertisers have used both methods of transaction, Programmatic and Direct Deals, to purchase display ad inventory.

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home using Display with Social Ads, 65 percent multi-home with Digital Video, and 43 percent multi-home with In-App Ads.<sup>343</sup>

257) Consistent with advertiser multi-homing across various types of digital advertising, Professor Simonson's survey shows that advertisers would divert advertising spending from display advertising to other types of digital advertising if the cost of programmatic display advertising increases by "a small but significant amount." For example, his survey shows that 56 percent to 59 percent of the advertisers and ad agencies would respond to a "small but significant price increase" of Professor Gans' narrow definition of display ads by diverting ad spending "outside" of Professor Gans' candidate markets.<sup>344</sup> These substitution patterns are inconsistent with Professor Gans' narrow definition of display ads, but consistent with how display ads are defined by eMarketer and other sources, as discussed earlier.<sup>345</sup>

258) On the publisher side, Professor Gans asserts that "publishers do not have reasonable substitutes for ad exchanges."<sup>346</sup> This assertion is at odds with Google data, which indicate that publishers are also well-positioned to substitute to options "outside" Professor Gans' narrow definition

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<sup>343</sup> Figure 36, Figure 37, and Figure 38 reproduce Exhibit 75, Exhibit 76, and Exhibit 77 from Professor Simonson's report. Figure 36 shows that the total number of respondents who selected Display Ads corresponds to 331. Moreover, Figure 38 shows that 47 percent of ad agencies have used both methods of transaction, Programmatic and Direct Deals, to purchase display ad inventory.

<sup>344</sup> See Figure 39 through Figure 44. For example, among small advertiser who indicated they would divert ad spending in response to a price increase, 59 percent indicate they would substitute to Social Ads, 38 percent to Digital Video, 27 percent to in-App and 26 percent to CTV Ads. Among large advertiser willing to divert ad spending, 55 percent indicate they would substitute to Social Ads, 42 percent to Digital Video, 31 percent to CTV and 26 percent to in-App Ads. Among ad agencies willing to divert ad spending, 61 percent indicate they would substitute to Social Ads, 40 percent to Digital Video, 35 percent to CTV and 21 percent to in-App Ads.

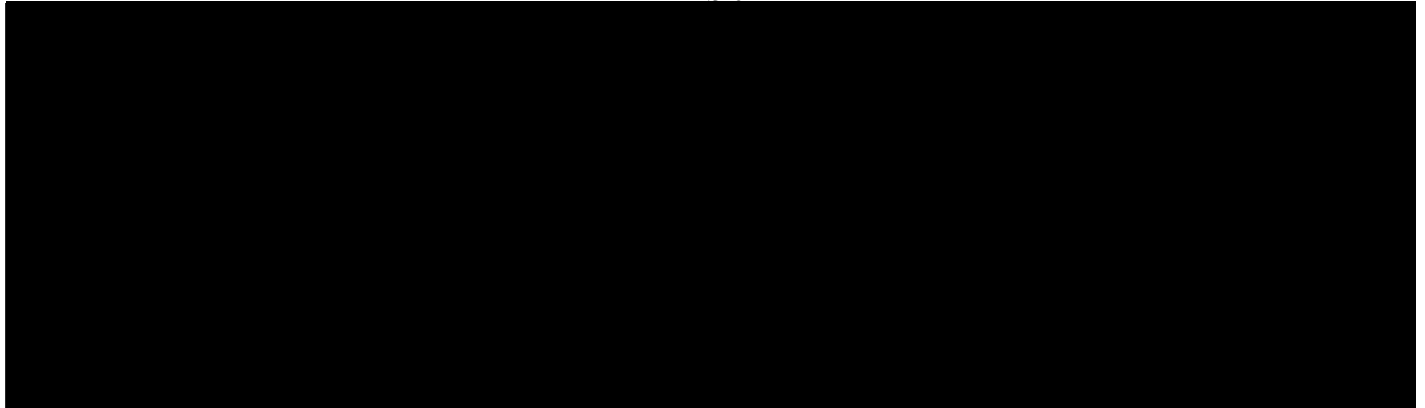
<sup>345</sup> Recall that, according to eMarketer, display ad spending includes advertising that appears on desktop, laptop computers, mobile devices, tablets, and other internet-connected devices. It also includes all ad formats such as banners, rich media, sponsorships, video, and media ads, regardless of transaction type.

<sup>346</sup> Gans Report, at ¶198.

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of ad exchanges for display ads. Exhibit 14 shows that about [REDACTED] of AdX publishers in Professor Gans' candidate exchange market multi-home on options that he excludes from his candidate market, including direct deals, video ads, ad networks, and mobile apps.<sup>347</sup> A SSNIP is unlikely to be profitable even if only a small fraction of multi-homing publishers substitute to one or more of alternatives. It is, therefore, plausible that publishers would respond to a SSNIP "inside" Professor Gans' candidate ad exchange market by substituting towards types of display ads he excludes from his candidate market.

**Exhibit 14**



Notes: Publishers are considered using a channel if greater than 0.5 percent of their total revenue is earned on that channel.

Source: MDL XPP Monthly Current Stats Data.

ii. Professor Gans' Flawed Data Analyses Fail to Demonstrate Lack of Substitution

259) Professor Gans' two data analyses concerning advertiser spend employ flawed methodologies and provide no information on the nature of substitution that is relevant for purposes of

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<sup>347</sup> Data show that only [REDACTED] of impressions are accounted for by single-homing publishers, and more than [REDACTED] of impressions are accounted for by publishers using four or more exchanges. (GOOG-AT-MDL-DATA-000482008 to -2531 (DFP data) and GOOG-AT-MDL-DATA-000066537 to -482007, GOOG-AT-MDL-DATA-000508827 to -58886, and GOOG-AT-MDL-DATA-000561536 to -4882 (AdX data)).



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market definition and fail to support exclusion of “walled garden platforms” from Professor Gans’ candidate relevant markets.

260) First, Professor Gans’ analysis of the “Facebook Boycott” fails to demonstrate lack of substitution from Facebook to Google in connection with a “Facebook Boycott.” As an initial matter, the Facebook Boycott fails as a “natural experiment” because: (i) participants self-selected into the boycott, they were not randomly or quasi-randomly selected, which is a condition for a natural experiment in economics;<sup>348</sup> (ii) Professor Gans selected a handpicked sample of these self-selected firms, further contaminating any claim to this representing a “natural experiment;”<sup>349</sup> and (iii) Professor Gans does not evaluate a control group from which to isolate any effect of the boycott (i.e., Professor Gans’ analysis does not measure the open web display ad spending of similar firms that did not participate in the boycott). In other words, Professor Gans has not constructed a valid counterfactual world.

261) Moreover, Professor Gans’ Facebook Boycott analysis asks the wrong question: it considers whether, over the course of one month, these hand-picked, self-selected firms increased their spend in open web display ads owing to an event outside Professor Gans’ candidate market. However, it is well-known in economics literature that the impact of a change in the price of good A on the demand for good

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<sup>348</sup> Mark R. Rosenzweig and Kenneth I. Wolpin, “Natural ‘natural experiments’ in economics,” *Journal of Economic Literature*, Vol. 38, No. 4, 2000, pp. 827-874, at p. 828. (“Given the difficulties of carrying out and financing experiments with near perfect random treatments to answer questions of general importance and the lack of credibility of many of the assumptions of standard instrumental variable studies, economists as well as researchers in other fields have sought out ‘natural experiments,’ random treatments that have arisen serendipitously. These putative natural experiments are usually changes or spatial variation in rules governing behavior, which are assumed to satisfy the randomness criterion.”).

<sup>349</sup> Gans Report, at ¶246, fn. 244. Among the “small advertisers” (i.e., the group Professor Gans purports to use Google Ads) he selects for his analysis of “most advertisers” are multi-national brands such as Coca-Cola, Campbell Soup, CVS, Best Buy, Diageo, Kimberly-Clark, Mars, Microsoft, Pfizer, Unilever, Starbucks, Target, Verizon, and Volkswagen.

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B is not necessarily the same as the impact of a change in the price of good B on the demand for good A.<sup>350</sup> Examining the impact on substitution into display advertising due to a transitory increase in the price of social media advertising simply does not provide relevant economic information about whether advertisers would substitute to social media ads in the event of a SSNIP in narrow display advertising.<sup>351</sup> In any case, closer inspection of the data that Professor Gans relies upon reveals that open web display ad spending *increased* by [REDACTED] during the relevant time.<sup>352</sup>

262) Similarly, Professor Gans' analysis of the impact of "Amazon Prime Days" on small advertiser ad spend also does not establish that what he describes as "walled garden platforms" should be excluded from his candidate market. By comparing ad spend on Google Ads for narrow display advertising in "Amazon Prime Day Months" with ad spending for the same month in different years without the Prime Day, he claims to find that Amazon Prime Days lead to increases in display ad spending via Google Ads.<sup>353</sup> At best, this measures the impact on ad spend in Professor Gans' narrow

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<sup>350</sup> See Edwin Mansfield, *Microeconomics*, Edition 8, W.W. Norton & Company, Inc., 1994, at p. 126. ("However, it should not be expected that the two elasticities will have the same numerical value. For example, goods X and Y may be substitutes, but the consumption of good X may be more sensitive to changes in the price of good Y than the consumption of good Y is to price changes of good X").

<sup>351</sup> Even if one takes at face value Professor Gans' analysis and his conclusion that there is lack of switching from social advertising to display advertising, the most that one can conclude about display ad buying tools is that they do not exert a competitive constraint on the price of social ad buying tools. This conclusion is not relevant to the case at hand.

<sup>352</sup> Professor Gans' Figure 6 indicates that average monthly display ad spend for his selection of 25 advertisers from January through June 2020, before the boycott, was [REDACTED]. The same advertisers' ad spend on Google Ads open web display from January through June 2021 increased to an average of [REDACTED] per month. Therefore, even accounting for seasonality, his own graph indicates a [REDACTED] increase in ad spend. Regardless, Professor Gans' conclusion that the "Facebook Boycott did not lead to an increase in spend on open web display advertisements via ad buying tools for advertisers" is not scientific and does not establish any causal relationship between the Facebook boycott and his asserted lack of impact on open web display ads for the 25 advertisers he selected. (Gans Report, at ¶245).

<sup>353</sup> "[T]he analysis shows an increase in Google display ad spending during Prime Day months compared to the same months in other years without the Prime Day, after accounting for seasonality and the increasing ad spending trend." (Gans Report, at ¶272). Specifically, Professor Gans averaged ad spend across advertisers by month from January 2016 through December 2022. After adjusting for seasonality, he first compared ad spending in October 2020 (a month with a Prime Day) to October in other years. His second analysis compared monthly display ad spending as a share of total annual display ad spending in months with Prime Days to those without Prime Days. (Gans Report, at ¶272, fn. 289).

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candidate market from a demand-induced transitory increase in spending on Amazon.<sup>354</sup> However, because the shock Professor Gans measures is demand-induced, an increase in Google Ads spending during Amazon Prime Day months does not imply a lack of substitution between narrow display advertising and advertising via Amazon. Rather, because advertisers of products featured on Amazon can reach users on the open web and direct them to Amazon for Prime Day, the increases in Google Ads spending during Amazon Prime Day Months that Professor Gans measures may in fact reflect the very substitutability between advertising on Amazon and narrow display advertising that Professor Gans claims to reject.<sup>355</sup>

*b. Professor Gans Ignores the Potential for Substitution at the Margin to Render a SSNIP Unprofitable*

263) Professor Gans' purported HMT analysis incorrectly ignores the basic economic principle that substitution occurs at the margin. The relevant question to define a market using the HMT is *not* whether *all* customers would stop using the product in a candidate market when faced with a higher price, but rather whether enough customers would reduce product usage, preventing a hypothetical monopolist from imposing a profitable SSNIP.<sup>356</sup> Instead, his analyses for small advertiser buying tools, large advertiser buying tools, and exchanges, and ad servers assess the profitability of a SSNIP based on

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<sup>354</sup> His analysis cannot econometrically identify Prime Days as the cause of the changes he observes. Professor Gans does not control for the multitude of factors other than Prime Day that could account for differences in display ad spending on Google Ads between Prime Day months and non-Prime Day months. That Prime Day last two days, but ad spending is measured at the month level further compounds the high likelihood that other factors contaminate any measured differences in Prime Day months and non-Prime Day month. Without adequate controls, again Professor Gans has failed to construct an adequate counterfactual world against which to measure any impact of Prime Days on display ad spending.

<sup>355</sup> Additionally, his methodology cannot distinguish these increases from effects stemming from Amazon's competitors (e.g., Best Buy and Walmart) increasing their ad spend to compete for the attention of internet users.

<sup>356</sup> For instance, given an alleged gross profit margin of 90 percent, a 5 percent price increase would be unprofitable if unit sales fell by 5.3 percent or more. See Michael L. Katz and Carl Shapiro, "Critical loss: Let's tell the whole story," *Antitrust*, Vol. 17 No. 49, 2002, at p. 50.

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whether *all of the customers* in a candidate product market would decide to stop using the product entirely. In particular:

- a. Professor Gans incorrectly asserts that “when there are distinct groups of consumers,” the hypothetical monopolist is prevented from imposing a SSNIP only if “all of those consumer groups will likely substitute away.”<sup>357</sup>
- b. Professor Gans incorrectly asserts that “[e]ffective substitution by publishers selling open web display inventory would imply *switching entirely* from the open web to an alternative type of inventory.”<sup>358</sup>
- c. Professor Gans incorrectly asserts that in response to an increase in the price of ad servers, publishers have two potential options. The first option would be “to stop selling or monetizing their ad inventory on their web properties.”<sup>359</sup> The second option would be “to build in-house serving capabilities to replace the publisher ad server.”<sup>360</sup>
- d. Professor Gans incorrectly opines that in response to an increase in take-rate from ad exchanges, publishers would have two potential options. The first option would be “to

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<sup>357</sup> Gans Report, at ¶131 (emphasis added).

<sup>358</sup> Gans Report, at ¶138 (emphasis added).

<sup>359</sup> Gans Report, at ¶158.

<sup>360</sup> Gans Report, at ¶160.

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stop monetizing their ad inventory on their web properties.”<sup>361</sup> The second option would be “to deal directly with advertisers as they once did during the early-Internet era.”<sup>362</sup>

- e. Professor Gans incorrectly states that in response to an increase in the price of ad buying tools, small advertisers would have four options. The first option would be “to stop display advertising campaigns and switch over to other types of advertising, such as search, social, in-app, or in-stream video advertising.”<sup>363</sup> The second option would be “to transact directly with publishers.”<sup>364</sup> A third approach would be to “build in-house buying tools.”<sup>365</sup> A fourth option would involve “switching to ad buying tools used by for [sic] large advertisers.”<sup>366</sup>

264) By ignoring the basic economics of marginal substitution, Professor Gans constructs artificially narrow markets. When one recognizes that advertisers and publishers have the option to alter the amount and mix of display ads they buy and sell in each candidate market in response to a SSNIP for narrow display advertising, rather than having to make an all-or-nothing decision to abandon narrow display advertising, the artificial narrowness of Professor Gans’ market becomes apparent. Professor Gans’ use of the relatively small share of publishers that use DFP to serve in-app advertisement as evidence of the inability to substitute ignores the fact that this advertising mix is a product of the current

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<sup>361</sup> Gans Report, at ¶195.

<sup>362</sup> Gans Report, at ¶196.

<sup>363</sup> Gans Report, at ¶237.

<sup>364</sup> Gans Report, at ¶238.

<sup>365</sup> Gans Report, at ¶238.

<sup>366</sup> Gans Report, at ¶239.

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price level.<sup>367</sup> As such, this analysis is incorrect as it is static, in essence assuming away any marginal substitution. Thus, it provides no information about the ability to substitute in response to a SSNIP in serving narrow display advertising.

265) Further, Professor Gans asserts that because publisher and advertiser tools are necessary to serve narrow display advertising, neither publishers nor advertisers would stop using these tools in response to a SSNIP.<sup>368</sup> But this assertion by Professor Gans is a non-sequitur; the HMT does not ask whether publishers and small advertisers would completely abandon their tools in response to a SSNIP for narrow display advertising, but whether all types of possible substitution at the margin—including into different types of advertising transactions that can be made with the same tools as well as alternative ways of monetizing content—render the SSNIP unprofitable. Again, ignoring the basic economic principle of substitution at the margin leads Professor Gans to define erroneously narrow product markets.

*c. Professor Gans Ignores Indirect Network Effects*

266) Professor Gans ignores indirect network effects within and across components of the ad tech stack. Although Professor Gans acknowledges the existence of indirect network effects across each element of the ad tech stack, he fails to take these into account when employing his HMT test.<sup>369</sup> Instead,

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<sup>367</sup> Gans Report, at ¶137.

<sup>368</sup> Gans Report, at ¶¶138 (“Ad servers can be used by publishers to offer display advertising, in-app advertising, and video advertising. It can also be used to facilitate direct deals with advertisers. However, publishers that sell display ad space on the open web must use an ad server.”), ¶226 (“Ad buying tools for small advertisers can serve several types of inventories, such as display inventory, video inventory, in-app inventory, Connected TV inventory, search inventory. However, small advertisers that want to purchase open web display advertising must use an ad buying tool.”).

<sup>369</sup> Professor Gans explains that “ad tech tools facilitate the advertising transaction between publishers and advertisers,” and notes that it is “reasonable to consider ad tech tools as bringing the two sides of the market together (i.e., transaction demand from advertisers and

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Professor Gans purports to implement the conventional one-sided HMT for each distinct product without controlling for the indirect network effect that a price increase on one customer group (e.g., publishers) would have on the behavior of different groups (e.g. advertisers and content viewers). For example, a hypothetical monopolist of a candidate ad exchange market who raises its price to publishers by a small but significant non-transitory amount must also account for possible substitution by content viewers and advertisers, since they must remain on board in order for the exchange to be paid for facilitating the sale of an impression.

267) By failing to account for indirect network effects, the one-sided HMT underestimates the loss in sales due to an increase in price. As a consequence, Professor Gans’ purported one-sided HMT for each of the markets he proffers—small buyer advertising tools, large buyer advertising tools, ad exchanges, and ad servers—is likely to incorrectly predict a positive profit change for the hypothetical monopolist, and the markets would be defined too narrowly.<sup>370</sup> Failure to consider indirect network effects in the HMT is a clear error as a matter of economics and alone renders his opinion on market definition unreliable.

*d. Professor Gans Neglects to Consider Integration of the Ad Tech Stack*

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supply from publishers). The products in each of the relevant product markets I define . . . facilitate transactions between publishers and advertisers.” (Gans Report, at ¶132, fn. 101). He also notes that “advertisers can benefit from more publishers joining an individual ad exchange. . . Similarly, publishers benefit from more advertisers available in an ad exchange as it results in higher and more varied demand for their inventory.” (Gans Report, at ¶¶381-382).

<sup>370</sup> OECD, “Rethinking Antitrust Tools for Multi-Sided Platforms,” 2018, available at: <https://www.oecd-ilibrary.org/docserver/a013f740-en.pdf>, at p. 46. (“Since positive indirect network effects between the different sides of the platform reduce the profitability of any price increase, the risk of applying a one-sided SSNIP test, which does not account for these feedback effects, is that in such cases the two markets may be defined too narrowly.”). As Lapo Filistrucchi has explained, in the context of multi-sided markets, data requirements for the implementation of the SSNIP are not only own- and cross-price elasticities of demand on the two-sides of the market but also indirect network effects. (Lapo Filistrucchi, “A SSNIP test for two-sided markets: the case of media,” NET Institute Working Paper, No. 08-34, available at: [http://www.netinst.org/Filistrucchi\\_08-34.pdf](http://www.netinst.org/Filistrucchi_08-34.pdf), at p. 22).

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268) Although Professor Gans acknowledges that Google operates as a vertically integrated ad tech stack,<sup>371</sup> he ignores the pricing incentives resulting from integration of the ad tech stack. Even under Professor Gans’ distinct “tools” market approach, which is erroneous for the reasons discussed above, integration is relevant. Professor Gans’ theories of competitive harm are all expressed in reference to his claim that Google’s vertical integration is the root of Google’s monopoly power.<sup>372</sup> However, he conducts his market definition analysis without considering Google’s vertical integration.

269) Vertical integration is relevant because an integrated firm that raises the price of one component of its ad tech stack may induce lower demand for other components of its ad tech stack, thereby reducing the profitability of the initial price increase. Professor Gans fails to consider that, if a vertically integrated hypothetical monopolist raises the price it charges publishers for serving ads on its ad server, it will make less money from publishers on its ad exchange. Likewise, Professor Gans fails to consider that, if a vertically integrated hypothetical monopolist raises the price it charges advertisers for buying ads on its buying tools, it will make less money on its exchange because the reduction in advertisers results in lower revenues from matches on the exchange.<sup>373</sup> These effects are different than indirect network effects, which further reduce an integrated hypothetical monopolist’s incentives to raise

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<sup>371</sup> Gans Report, at ¶63 (“Google is vertically integrated across all relevant product markets that I define below. Google provides the DFP ad server, AdX ad exchange, Google Ads ad buying tool for small advertisers, and DV360 ad buying tool for large advertisers.”).

<sup>372</sup> Gans Report, at ¶63 (“Google is vertically integrated across all relevant product markets that I define below. Google provides the DFP ad server, AdX ad exchange, Google Ads ad buying tool for small advertisers, and DV360 ad buying tool for large advertisers. This integration uniquely positions Google to leverage market power across these markets.”).

<sup>373</sup> This arises for at least three reasons: First, and as discussed in Section V.C, fewer bidders results in lower auction prices and, because the ad exchange earns a percentage of the value of the match, the exchange revenue falls. Second, with fewer advertisers to match for a given number of publishers (ignoring indirect network effects), the quality of matches declines on the exchange. Third, even if an advertiser was unaware of the price increase and did not alter its behavior, its ad spend will enter the auction with lower bids, making it more likely that another demand source (e.g., header bidding) will win the impression or that it goes unfilled. In either case, the integrated ad exchange loses revenue.



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prices. Expressed differently, the HMT applied to an integrated hypothetical monopolist will result in a market that is broader than when an HMT is applied to each component of the ad tech stack in isolation. Because an integrated hypothetical monopolist loses more sales from a SSNIP than a non-integrated hypothetical monopolist, the product market will be drawn too narrowly if one does not account for vertical integration.

270) One cannot view market definition and the theory of anticompetitive harm as if they were independent from each other.<sup>374</sup> Otherwise, the defined relevant market is unhelpful or misleading in the analysis of whether the conduct being challenged harmed competition.<sup>375</sup> This flaw in Professor Gans' analysis is well-known as the "independent market fallacy."<sup>376</sup> Because Professor Gans' candidate relevant markets do not consider vertical integration, they are untethered from his market impact analyses, which are premised on vertical integration, and his conclusions regarding market definition, monopoly power, and harm to competition are unreliable.<sup>377</sup>

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<sup>374</sup> David Glasner and Sean P. Sullivan, "The Logic of Market Definition," *Antitrust Law Journal*, Vol. 83, No. 2, 2020, pp. 293-345, at p. 312 ("The independent market fallacy is the common misconception that relevant markets exist independent of a theory of anticompetitive injury.").

<sup>375</sup> David Glasner and Sean P. Sullivan, "The Logic of Market Definition," *Antitrust Law Journal*, Vol. 83, No. 2, 2020, pp. 293-345, at p. 316 ("A meaningful relevant market must be conditioned on a specific theory of anticompetitive harm; otherwise, the relevant market cannot properly inform the analysis of competitive effects.").

<sup>376</sup> David Glasner and Sean P. Sullivan, "The Logic of Market Definition," *Antitrust Law Journal*, Vol. 83, No. 2, 2020, pp. 293-345, at p. 312 ("The independent market fallacy is the common misconception that relevant markets exist independent of a theory of anticompetitive injury.").

<sup>377</sup> David Glasner and Sean P. Sullivan, "The Logic of Market Definition," *Antitrust Law Journal*, Vol. 83, No. 2, 2020, pp. 293-345, at p. 316 ("A meaningful relevant market must be conditioned on a specific theory of anticompetitive harm; otherwise, the relevant market cannot properly inform the analysis of competitive effects.").

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**C. Google Operates an Integrated, Multi-Sided Transaction Platform that Matches Publishers and Advertisers**

271) The correct framework for defining a relevant product market in this case is an integrated, multi-sided transaction platform market for matched impressions, whereby an advertiser is matched to a publisher and the advertiser's ad is displayed to a content viewer. Professor Gans has not defined or attempted to define such a market that would encompass Google's role as an integrated, multi-sided platform operator. Put differently, Professor Gans has not attempted to define a relevant market in which the alleged conduct occurred.

***1. Ad Tech Tools Should Not Be Analyzed Separately Because They Work Together to Match Publishers and Advertisers***

272) "The products in each of the relevant product markets [Professor Gans] define[s] (publisher ad servers, ad exchanges, ad buying tools for large advertisers, and ad buying tools for small advertisers) facilitate transactions between publishers and advertisers."<sup>378</sup> That is, no market participant "purchases" a tool for any other reason but to buy or sell a display ad.

273) Broadly, an advertiser or publisher "pays" to use the tools offered by firms operating in any of Professor Gans' candidate markets conditional upon whether an ad is served.<sup>379</sup> The amount paid generally depends on the overall value or number of ads served. Because tools are inextricably linked to

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<sup>378</sup> Gans Report, at ¶132, fn. 101.

<sup>379</sup> Although customers "pay" for some tools in Plaintiffs' candidate markets based on other types of outcomes, such as "clicks," these other outcomes are also conditional upon whether an ad is served. That is, a click cannot occur if a publisher does not serve an ad for the internet user to click. See Google Ads Help, "Understanding costs and payments," available at: <https://support.google.com/google-ads/answer/9846714>. Accessed August 6, 2024.

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displaying an ad, advertisers are buying matches with publisher impressions, publishers are buying matches with advertisers, and the relevant product is matched impressions.

Therefore, the relevant market for analyzing the antitrust claims in this case is a multi-sided transactions platform market for matched impressions, whereby an advertiser is matched to a publisher and the advertiser's ad is displayed to an internet user. This is the case even if one were to examine each of Professor Gans' candidate markets separately (which I do not endorse). Customers pay for a "tool" when there is a transaction, and a matched impression requires an advertiser, a publisher and a user.

***2. Ad Tech Tools Should Not Be Analyzed Separately Because Google Operates Its Ad Tech Stack as An Integrated, Multi-sided Platform***

274) Because the antitrust claims in this matter are targeted at Google—a multi-sided platform that operates an integrated ad tech stack—it is most appropriate to examine what Google's multi-sided platform produces holistically (e.g., matched impressions) rather than analyzing candidate markets for buying tools, exchanges and ad servers separately.

275) The integrated nature of Google's ad tech offerings—advertiser buying tools, publisher ad server, and ad exchange—means that it must set prices for customers using its multi-sided integrated ad tech platform to calibrate externalities across and within components of its ad tech stack. Pricing that reduces (increases) the participation on one side, reduces (increases) the value and participation on the other, with attendant feedback effects. The presence of indirect network effects implies that the ultimate impact of a price increase to advertiser-side products (or publisher-side products) can be considerably greater than the initial direct impact. For instance, a price increase in buying tools will reduce

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participation of advertisers, which in turn will reduce participation of publishers. Feedback effects further deteriorate advertiser and publisher participation.

276) Google's ad tech stack is operated as an integrated, multi-sided platform; Google does not price ad tech components "as if" they were stand-alone products. For example, Google charges publishers a [REDACTED] revenue share on its ad exchange but does not charge fees to [REDACTED]<sup>380</sup> of publishers using its ad server (including many that do not use Google's ad exchange). By not accounting for integration and indirect network effects—which both constrain the profitability of a SSNIP—Professor Gans incorrectly assesses the pricing incentives of the hypothetical monopolist. Defining distinct relevant markets around individual components of Google's integrated ad tech stack does not mirror the incentives that Google would face if it was, as Professor Gans claims, a monopolist in one or more of his candidate markets.

277) As discussed above, Professor Gans fails to demonstrate that relevant ad impressions are limited to his narrow definition. Data and survey results indicate that customers multi-home across different types of ads, platforms, and types of deals, and are well-positioned to substitute alternatives that Professor Gans excludes (e.g., video ads, mobile in-app ads, social media ads, and direct deals). Survey results indicate that advertisers would substitute these alternatives were a SSNIP imposed in Professor Gans' candidate markets. As I showed earlier, Plaintiffs' narrow definition of display ads accounts for [REDACTED] of all ad spend in the United States, and excludes significant volumes of ad spend

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<sup>380</sup> See Figure 45. As discussed in more detail in Section IX, Google's pricing of its ad tech is lower as a result of it operating an integrated ad tech stack than would prevail if it priced these components separately. Again, this is true even in the absence of indirect network effects between advertisers, publishers, and users; indirect network effects provide additional incentives for a multi-sided platform to charge lower prices.

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on other display ads as well as spend on a variety of other digital ads.<sup>381</sup> Video ads alone have increased from 2 percent in 2013 to nearly 24 percent of all media spend today—more than three times the size of Plaintiffs’ candidate markets. Cross-visitation patterns allow advertisers and publishers to reach content viewers via video ads, mobile in-app ads, social media ads, and other avenues that Professor Gans excludes. As I have also noted, Professor Simonson’s survey results indicate that advertisers would substitute to ad formats and types Professor Gans excludes. For these reasons, the relevant ads that are matched in this case is broader than Professor Gans’ narrow definition of display ads, and plausibly at least as large as display ads as defined by eMarketer (e.g., including video ads, mobile in-app ads, social media ads, and direct deals).<sup>382</sup>

## VII. GOOGLE DOES NOT HAVE MONOPOLY POWER

278) Professor Gans concludes that Google has monopoly power in three of his four candidate markets: “the market for publisher ad servers used for the sale of open web display advertising space,” “the market for ad exchanges for transacting indirect open web display advertising,” and “the market for ad buying tools for small advertisers for buying open web display advertising space.”<sup>383</sup> In this section, I explain that, even assuming Professor Gans’ candidate markets are correctly defined (which they are not), he has failed to show Google has monopoly power in those markets because he offers no analysis of traditional forms of direct evidence of monopoly power—decrease in output, increase in price, or reduction in quality—to support his conclusions. When I examine the data on output, price, and quality,

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<sup>381</sup> See Exhibit 1.

<sup>382</sup> Because indirect network effects constrain the profitability of a SSNIP, and integration of ad tech components further constrains the profitability of a SSNIP, the relevant product market may include additional types of ads.

<sup>383</sup> Gans Report, at ¶¶14, 348-406, Section V.C.

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I conclude that it is inconsistent with Google having monopoly power in any of Professor Gans' candidate markets.

279) I also explain that Professor Gans has failed to show Google has monopoly power through his examination of indirect evidence of monopoly power—namely market shares and other purported structural characteristics of his candidate markets. Professor Gans' calculations of market shares are based on flawed methodology, does not utilize third-party data (which is an essential component of a market share), and relies on documents that are inconsistent with the narrow candidate markets he defines. Professor Gans' examination of Google's monopoly power also ignores important economic considerations that constrain Google's ability and incentive to exercise monopoly power, even in the narrow candidate markets he defines. For example, he fails to examine the extensive multi-homing of both advertisers and publishers with rival ad tech in his candidate markets. Because customers that multi-home can easily divert ad spend and inventory to rivals, market shares understate the competitive significance of rivals. He also fails to consider that Google's ad tech may have a high share because of its high quality or low prices relative to rivals. For example, Professor Gans concludes that Google has monopoly power in his candidate ad server market because, in part, he asserts its market share is [REDACTED].<sup>384</sup> He completely ignores that the low prices Google charges for serving ads on its DFP ad server are inconsistent with Google exercising monopoly power. A more plausible reason for why Google

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<sup>384</sup> "For the years 2018 and 2019, DFP had a [REDACTED] market share in terms of the number of addressable domains." (Gans Report, at ¶353).

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enjoys a high share is that customers value its mix of quality and price.<sup>385</sup> In my opinion, Professor Gans' analysis of the indirect evidence is incomplete, based on erroneous assumptions, and therefore unreliable.

280) I further explain that Professor Gans' opinions on monopoly power are flawed because they are based on incorrectly defined markets that fail to capture all sources of competition and ignore the importance of indirect network effects and vertical integration on its pricing decisions. Collectively, these flaws result in Professor Gans overstating Google's market shares in his candidate markets and render unreliable his conclusions that Google possesses monopoly power. Based on my examination of data and the record, I conclude that Google does not possess monopoly power: there is no economic basis for concluding that Google has profitably sustained monopoly prices or reduced output or quality to the detriment of advertisers, publishers, and users.

**A. The Proper Economic Framework for Examining of Monopoly Power**

281) Professor Gans has not reliably examined whether Google has monopoly power. In standard single-sided markets, economists define market power as the ability of a firm to profitably raise prices above the competitive level, which is typically assumed to be marginal cost (i.e., the additional cost of producing an additional unit of output).<sup>386</sup> The ability of a firm to set prices above marginal cost is not

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<sup>385</sup> Google documents indicate that there is considerable heterogeneity in the quality of publisher ad servers, and that DFP has been regarded as one of the most reliable. *See, e.g.*, GOOG-TEX-00441752, at -783. (A slide titled "Head Customers: Value Assessment, XFP at launch" which looks at XFP, Microsoft, Yahoo, AdTECH, OpenX, WPP (24/7), DFP, and Zedo and assigns total scores ranging from 140.00 to 339.00. DFP has a score in the "Infrastructure (reliability+latency)" category of 7.0, which is the second highest score).

<sup>386</sup> *See, e.g.*, Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, Edition 4, Pearson, 2005, at p. 642 ("A firm (or group of firms acting together) has market power if it is profitably able to charge a price above that which would prevail under competition, which is usually taken to be marginal cost.").

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unusual, as nearly all firms profitably charge prices in excess of marginal cost.<sup>387</sup> The mere ability to raise prices above marginal cost is not, by itself, anticompetitive if it stems from innovation, superior product quality, or similar bases that are competition on the merits.<sup>388</sup> Instead, when economists examine whether market power rises to the level that could support an antitrust concern, they typically examine whether a firm is able to exercise market power substantially and sustainably.<sup>389</sup> I use the term “monopoly power” as shorthand for substantial and sustained market power.

282) In multi-sided markets, departures of prices from marginal cost do not generally imply market power or anticompetitive prices. This is because the analysis of a single side of a multi-sided platform in isolation leads to a distorted picture of the competitive environment.<sup>390</sup> To analyze the market power of a two-sided or multi-sided transaction platform, one must carefully consider the indirect network effects and interplay among all the groups (e.g., publishers, advertisers, and users) and recognize

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<sup>387</sup> “This ability to set price above marginal cost implicitly uses the model of perfect competition as a benchmark against which to measure the behavior of firms. If this definition is applied literally, probably every firm in the United States has at least a tiny bit of market power. The model of perfect competition is an extreme one that describes few, if any, actual industries.” (Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, Edition 4, Pearson, 2005, at p. 642).

<sup>388</sup> “What is clear is that profits are necessary to grease the competitive process. It is the quest for profits that encourages innovation in the first place; it is the quest for profits by imitators that spurs competition. And if the innovator responds to the imitator with lower prices it need not be predation but merely the process of competition at work. In the high-technology context, a monopolist cannot therefore be identified by traditional (textbook) marginal cost pricing tests, such as the Lerner index.” (David Teece and Mary Coleman, “The Meaning of Monopoly: Antitrust Analysis in High- Technology Industries,” *The Antitrust Bulletin*, Fall-Winter 1998, pp. 801-857, at p. 824).

<sup>389</sup> See, e.g., Franklin M. Fisher, “Chapter 14: Detecting Market Power” in *Issues in Competition Law and Policy*, ed. American Bar Association Section of Antitrust Law, 2008, at p. 354 (“What matters is substantial market power, that is, the ability to charge significantly supranormal prices or offer significantly supranormal product quality for a nontrivial time period without losing so much business to competitors (or potential competitors) as to make such actions unprofitable.”).

<sup>390</sup> “[For two sided platforms], price equal to marginal cost (or average variable cost) on a particular side is not a relevant economic benchmark for evaluating either market power or claims of predatory pricing...the price on each side is a complex function of the elasticities of demand on both sides, indirect network effects, and marginal costs on both sides. Thus, it is incorrect to conclude, as a matter of economics, that deviations between price and marginal cost on one side indicate that [two sided platforms] are pricing to exploit market power and drive out competition.” (David S. Evans and Michael Noel, “Defining Antitrust Markets when Firms Operate Two-Side Platforms,” *Columbia Business Law Review*, Vol. 2005, No. 3, 2005, pp. 667-701, at p. 696). I note that indirect network effects from a third group make this relationship even more complex.



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that these links necessarily limit market power.<sup>391</sup> Professor Gans has not done this analysis and therefore he has not reliably examined whether Google has monopoly power.

283) A high market share alone is not sufficient to infer monopoly power. It is well-known in economics that even firms with 50 percent or even 100 percent market shares may have no market power whatsoever.<sup>392</sup> A firm may enjoy a high market share because it offers a higher quality product, charges a lower price, or is more efficient at serving customers than its competitors. Such a firm, nonetheless, may face competitive pressure from rivals that constrains its ability to significantly raise prices or reduce quality.<sup>393</sup> This is particularly true in multi-sided markets, where the economics literature indicates that “[e]ven markets that appear to be dominated by a single player may be contestable.”<sup>394</sup> In such cases, a high share is not indicative of monopoly power. Consequently, complete examination of monopoly power requires examination of these and other factors, including repositioning and expansion inside and outside of the market. Professor Gans fails to provide such an analysis.

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<sup>391</sup> “The link between the customers on the two sides limits the extent to which a price increase on either side is profitable. Therefore, it necessarily limits market power, all else equal.” (David S. Evans and Michael Noel, “Defining Antitrust Markets When Firms Operate Two-Side Platforms,” *Columbia Business Law Review*, Vol. 2005, No. 3, 2005, pp. 667-701, at p. 695).

<sup>392</sup> Two textbook examples where high market shares translate into zero market power are homogenous product Bertrand competition (where competition constrains two firms with 50 percent market shares to charge the perfectly competitive price) and contestable markets (where potential competition constrains a firm with a 100 percent market share to charge the perfectly competitive price). *See, e.g.*, Michael R. Baye and Jeffrey Prince, *Managerial Economics and Business Strategy*, Edition 10, McGraw Hill, 2022, at pp. 292-294, 296-297 (“From the viewpoint of consumers, Bertrand oligopoly is desirable: It leads to precisely the same outcome as a perfectly competitive market.” In a contestable market, “incumbent firms (existing firms in the market) have no market power over consumers.”).

<sup>393</sup> “Market shares are imperfect indicators of market power, so additional analysis of the economic conditions is necessary before one can reach a conclusion about market power. For example, if entry is easy, then the industry pricing is severely constrained regardless of whether an existing firm has a large market share.” (Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, Edition 4, Pearson, 2005, at p. 644).

<sup>394</sup> David S. Evans, “The Antitrust Economics of Multi-Sided Platform Markets,” *Yale Journal on Regulation*, Vol. 20, 2003, pp. 325-381, at p. 360.

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284) Given the distorted picture market share and other indirect evidence of monopoly power can paint, economists generally examine direct economic evidence to examine whether a firm has monopoly power. The idea is simple: if Google gained monopoly power as a result of the business practices described by Professor Gans, this would directly translate into substantially higher prices or lower quality than would prevail absent the conduct. One would also observe reductions in market output (or possibly, reductions in Google's output that allowed it to substantially raise its own prices). Conversely, if one observes that quality and output increased, and prices did not, then direct evidence is inconsistent with Google obtaining or being able to exercise monopoly power.<sup>395</sup>

285) Put simply, direct economic evidence that Google—as a provider of an integrated ad tech stack—has monopoly power requires showing that Google has profitably sustained monopoly prices and restricted output or quality, to the detriment of advertisers, publishers, and users (i.e., Google taking a larger share of a smaller pie).<sup>396</sup> Professor Gans has failed to do so. As discussed below, direct evidence indicates that Google's prices have not increased above the competitive levels that prevailed before the business practices at issue in this case, despite investments in its ad tech that have increased quality and the number of ad transactions (to the benefit of advertisers, publishers, and users as a whole). Additionally, strategic planning documents indicate that Google competes with other large platforms that Professor Gans excludes from his analysis of monopoly power (such as Facebook, Apple, Amazon,

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<sup>395</sup> Note that increases in quality and increases in demand would typically result in higher prices in the absence of monopoly power. Thus, even if prices did increase, quality-adjusted prices may be lower.

<sup>396</sup> I note that, under certain conditions, a firm that takes a larger slice of a larger pie may lack market power. Any extra earnings may merely reflect a competitive return on the investments to grow the value of the pie for everyone.

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and the TradeDesk).<sup>397</sup> Based on this and other analyses, I conclude Google does not have monopoly power—there is no economic basis for concluding that Google has profitably sustained monopoly prices or reduced output or quality to the detriment of advertisers, publishers, and users.

**B. Professor Gans’ Conclusion that Google Has Monopoly Power Is Unreliable Even if We Accept His Relevant Markets Because He Ignores Direct Evidence of Price, Output, and Quality**

286) Professor Gans defines “monopoly power” as the “ability to price a product above the competitive level, reduce quality, service and/or innovation below the competitive level, or exclude competition.”<sup>398</sup> Based on this definition, Professor Gans finds that Google has monopoly power in three candidate markets: “the market for publisher ad servers used for the sale of open web display advertising,” “the market for ad exchanges for transacting indirect open web display advertising,” and “the market for ad buying tools for small advertisers for buying open web display advertising space.”<sup>399</sup> As I discuss in more detail below, Professor Gans’ opinions about monopoly power stem from his flawed methodology for defining relevant markets. Professor Gans has not expressed any opinion as to whether Google possesses monopoly power in markets relying on a definition of display ads more consistent with commercial realities and industry practice or in a market in which Google operates an integrated multi-sided transaction platform. But even assuming Professor Gans has properly defined his candidate markets, he does not demonstrate that Google possessed monopoly power in those markets.

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<sup>397</sup> Google lists these as some of its “largest competitors” in its 2021 Competitive Landscape. Strengths for each include: “Facebook has a “[l]arge signed-in user base across FB, IG, Messenger and WhatsApp;” “Moving [Apple’s] users away from ads can benefit its business, since it is more dependent of [sic] App Store revenue than ads revenue;” “Amazon’s “Full stack [is] comparable to Google’s (e.g., video platform, O&O display, mobile presence, 1P data) and years of shopping transaction data;” theTradeDesk “has the “[a]bility to provide a full service offering to customers.” (GOOG-AT-MDL-004299200, at -207-208.).

<sup>398</sup> Gans Report, at ¶295.

<sup>399</sup> Gans Report, at ¶¶348, 370, 392.

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287) In economics, market power is defined as the ability to set prices or reduce quality in a manner inconsistent with competitive outcomes.<sup>400</sup> The term “monopoly power” can be used to indicate substantial and sustained market power.<sup>401</sup> Professor Gans’ reference to the ability to “exclude competition” appears to be based on a legal definition.<sup>402</sup> As a matter of economics, firms without monopoly power “exclude” competitors in a variety of ways that do not result in diminishing their ability to compete in the market or otherwise relate to the exercise of monopoly power in an antitrust sense. For example, franchises exclude their competitors from becoming franchisees. Firms in highly competitive markets exclude their competitors from using their facilities, their brands, their technology, and so on. These forms of exclusion are economically efficient in that they protect property rights and incentives to innovate. In contrast, the economic definition of monopoly power logically incorporates the concept of a firm excluding its rivals from being able to compete in a market as such actions would allow the monopolist to restrict market output and sustain prices above and quality below competitive levels. Although Professor Gans makes numerous references to “exclusion” throughout his report, his analyses

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<sup>400</sup> See, e.g., Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, Edition 4, Pearson, 2005, at p. 642 (“A firm (or group of firms acting together) has market power if it is profitably able to charge a price above that which would prevail under competition, which is usually taken to be marginal cost.”) A reduction in quality leads to an increase in the quality-adjusted price.

<sup>401</sup> William J. Baumol and Daniel G. Swanson, “The New Economy and Ubiquitous Competitive Price Discrimination: Identifying Defensible Criteria of Market Power,” *Antitrust Law Journal*, Vol. 70, 2003, pp. 661-686, at p. 662, fn. 2 (“[G]enerally, monopoly power is taken simply to mean possession of very strong market power.”)

<sup>402</sup> Professor Gans refers to an FTC site and a 1987 Georgetown Law Journal article posted on the DOJ website. (Gans Report, at fn. 315, ¶295). The article on the DOJ website appears to describe disagreement (“linguistic incompatibilities”) arising from the legal definition of “excluding competition” in cases concerning monopoly power. “Supreme Court opinions demonstrate a marked inconsistency as to whether market power and monopoly power are similar or distinct concepts. We can find no Supreme Court opinion that contrasts the terms ‘market power’ and ‘monopoly power’ deliberately and explicitly, i.e., that finds the existence of one but not the other. Recently, in *Matsushita Electric Industrial Co. v. Zenith Radio Corp.*, [FN30] Justice Powell’s majority opinion appeared to use both terms to mean the power to price profitably above cost. [FN31] Other Supreme Court opinions also appear to treat market power and monopoly power as identical concepts. [FN32]

Despite these references, however, the Supreme Court, in other cases, seems to have articulated standards for ‘monopoly power’ and ‘market power’ that, at least linguistically, are incompatible. In *NCAA v. Board of Regents*, [FN33] the Court defined ‘market power’ as ‘the ability to raise prices above those that would be charged in a competitive market.’ [FN34] By contrast, the Supreme Court has consistently defined ‘monopoly power,’ at least for section two cases, in accordance with the definition articulated in *United States v. E. I. du Pont de Nemours & Co.* [FN35]-i.e., as ‘the power to control prices or exclude competition.’”

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do not differentiate between exclusion of competitors more broadly (i.e., economically benign or efficient exclusion that may occur from competition on the merits) from exclusion that deprives rivals of the ability to compete (i.e., exclusion *from the market*). As a result, Professor Gans’ analyses conflate the inquiry into whether Google has monopoly power with whether Google’s conduct harms competitors by restricting the ways in which they can profit from Google’s investments.<sup>403</sup>

288) A notable omission in Professor Gans’ analysis is that, despite defining monopoly power as “the ability to price a product above the competitive level, [or] reduce quality, service and/or innovation below the competitive level,” his conclusion that Google has monopoly power is not based on an examination of data on industry output or Google’s pricing or quality. He also fails to define the competitive benchmark against which to measure Google’s pricing or quality in order to determine whether they are inconsistent with competitive levels and evidence of monopoly power. Despite the availability of such data, Professor Gans instead relies only on structural characteristics of the ad tech industry, such as market shares, switching costs, data advantages, and entry and exit. This myopic focus on structure rather than the key metrics of competitiveness in an industry—i.e., price, output, and quality—renders his conclusions about monopoly power incomplete and unreliable.

289) In my opinion, the direct evidence is inconsistent with Google having monopoly power in any of Professor Gans’ candidate markets. To the contrary, the data clearly demonstrate that the ad tech industry is dynamic and competitive, and that Google does not have, and is unlikely to obtain, monopoly

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<sup>403</sup> See Louis Kaplow, “On the relevance of market power,” *Harvard Law Review*, Vol. 130, 2017, pp. 1303-1407, at pp. 1393-1395, fn. 195.

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power. At the industry level, Exhibit 15 shows that industry output<sup>404</sup> (measured in terms of ad spend) has risen since at least 2010 while at the same time market prices of digital ads have declined over time.<sup>405</sup> Such overall industry expansion and decline in prices is inconsistent with Google having monopoly power that would allow it to anticompetitively exclude competitors, restrict output, and increase prices or decrease quality.

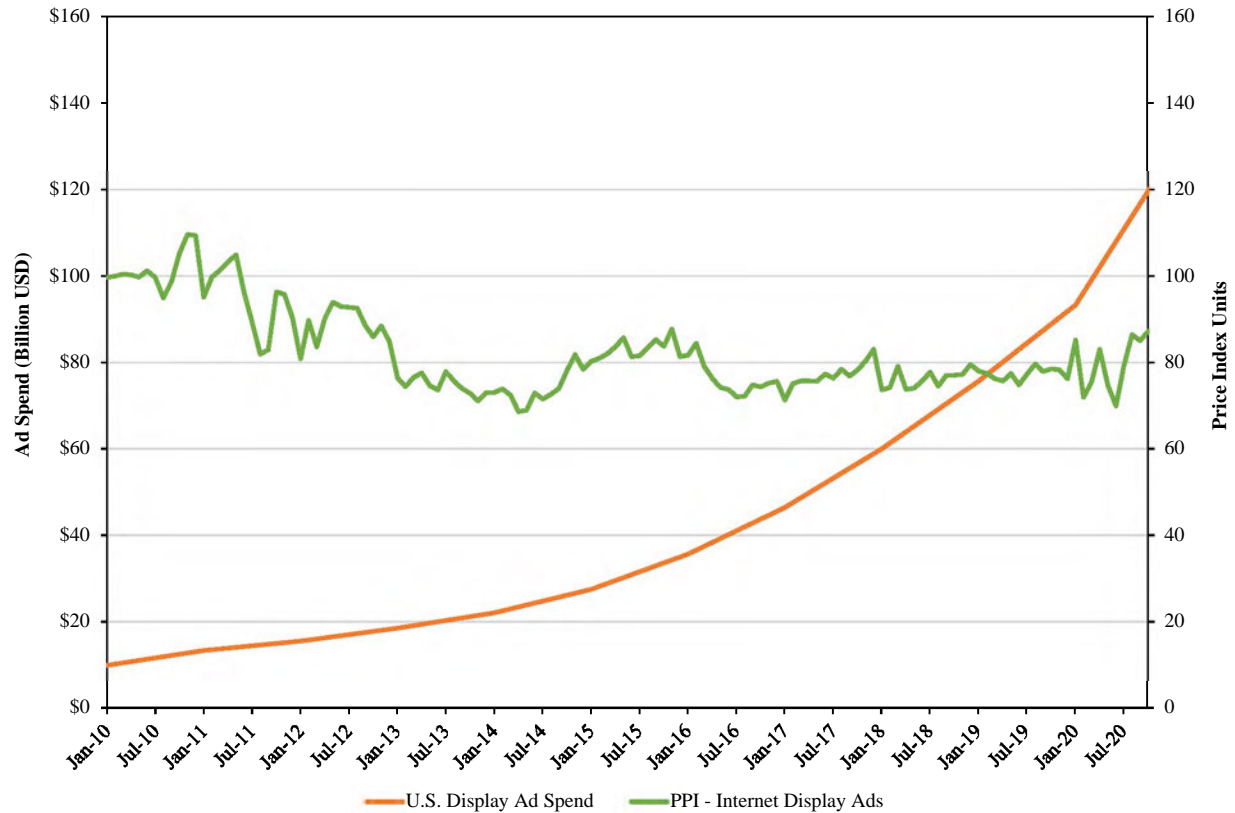
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<sup>404</sup> See also Exhibit 8, which shows industry ad spend on digital display ads over time where “display ads” are as defined by eMarketer.

<sup>405</sup> Figure 46 shows price data from the U.S. Bureau of Labor Statistics (“BLS”). The Producer Price Index (“PPI”) for newspaper ads grew faster than overall price levels in the economy, and then has been flat or declining since the late 2000. Figure 47 shows the PPI for print ads in newspapers has declined faster than the PPI for digital ads in newspapers; this indicates that the amount producers (newspapers) received from digital ads has declined less than the amount they received from print ads. Prices that advertisers using Google’s ad tech pay for ads have also declined.

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**Exhibit 15**  
**U.S. Display Ad Spend Compared to Prices for Internet Display Ads**  
**January 2010 - October 2020**



Notes: Display ad spending includes advertising that appears on desktop, laptop computers, mobile devices, tablets, and other internet-connected devices. It also includes all ad formats such as banners, rich media, sponsorships, video, and media ads, regardless of transaction type. The internet display ad PPI series is based on the BLS industry and commodity surveys respectively. Series have not been seasonally adjusted but have been re-indexed to the common base period of December 2009. This PPI series was discontinued in October 2020.

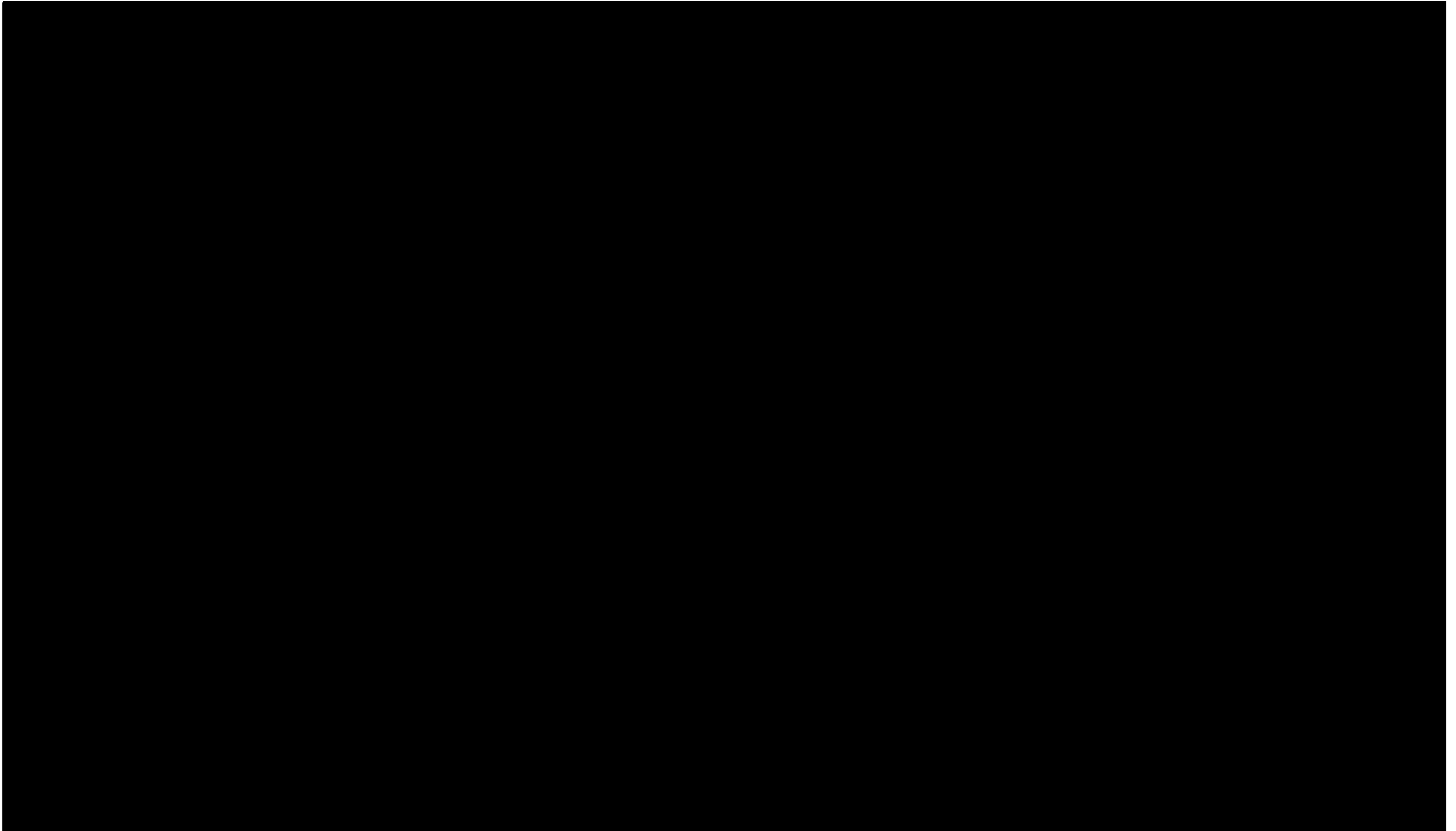
Source: Bureau of Labor Statistics Price Index Data; DOJ RFP 57 eMarketer Data - "U.S. Ad Spending 2023."

290) Not only has industry output increased and prices declined, but as discussed in more detail in Section V.F.4 and Section IX, Google's investments have resulted in its own output and quality increasing with no corresponding increase in prices. As shown in Exhibit 16, Google's integrated Google Ads margin (buying tool fee plus ad exchange revenue share, which includes the cost of serving the

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impression originating from Google Ads) has remained flat as its quality and output have expanded.<sup>406</sup> For instance, the volume of display ad impressions on DFP sourced from Google Ads, DV360, AdSense, header bidding, Open Bidding, direct deals, and other demand sources has increased from approximately [REDACTED] in June 2013 to over [REDACTED] in March 2023.<sup>407</sup>

**Exhibit 16**



Notes: The Google revenue share for Google Ads advertisers is calculated using Google Ads data as net revenue divided by gross revenue. The revenue share includes buy-side fees, and AdX fees including per impressions ad serving cost. Google Ads data are limited to U.S. advertisers.

Source: MDL RFP 243 Google Ads Data.

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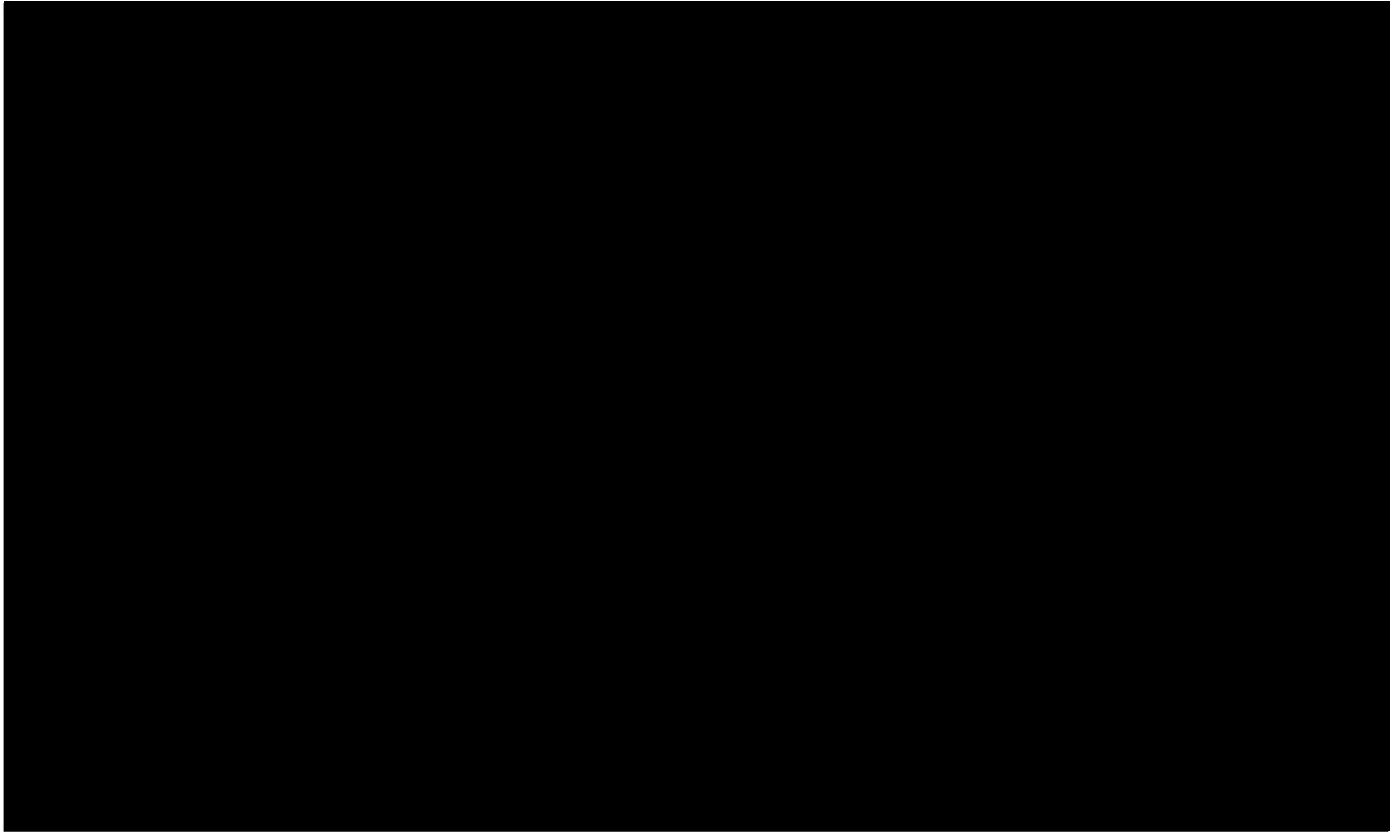
<sup>406</sup> See Exhibit 11. Figure 48 shows total conversions on Google Ads over time. Exhibit 17 shows impression volume through AdX in the candidate market for exchanges over time. Figure 49 shows impression volume on DFP for publishers purchasing narrow display ads over time. Increases in quality lead to increases in demand, which tend to increase prices even in the absence of monopoly power. Thus, when quality increases, real (quality-adjusted) prices decline even if nominal (quality-unadjusted) prices remain constant.

<sup>407</sup> See Exhibit 11



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**Exhibit 17**



Notes: Impressions and Fees from Google Ads are excluded.

Source: MDL RFP 243 AdX Data.

291) As I discussed earlier, DV360 fees, CPC prices on Google Ads, and the Google Ads' margin have declined or remained flat.<sup>408</sup> These data are consistent with internal documents.<sup>409</sup> If Google had monopoly power in Professor Gans' candidate market for ad buying tools for small advertisers for buying web display advertising, one would not see expanding output and increasing quality<sup>410</sup> with no

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<sup>408</sup> See Exhibit 2, Exhibit 5, and Exhibit 6.

<sup>409</sup> See, e.g., GOOG-DOJ-08138645, at -670 ("Buy-side revenue and pricing trends: DBM, DS, and GA growing at [REDACTED]; DBM/DCM prices down.").

<sup>410</sup> I discuss ad tech quality in Section VIII.B.4.

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corresponding increase in price. In my opinion, these data are inconsistent with Google having monopoly power and instead show a highly competitive industry.

292) Similar trends exist with respect to ad exchanges and ad servers. As shown earlier, the average revenue share for narrow display ads on Google's AdX has remained stable at [REDACTED] since its inception, despite advancements in quality discussed in more detail below.<sup>411</sup> It is also clear that Google's prices for DFP are below stand-alone monopoly prices. As shown by the data, ad serving fees on DFP have decreased since January 2014,<sup>412</sup> and more than [REDACTED] of Google's ad serving

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<sup>411</sup> See Exhibit 18. In 2010, an internal Google document titled "Evolution of the Industry & AdX History," Google noted that "[w]ith a revenue share of [REDACTED] DoubleClick made [REDACTED] on the first AdX transaction[.]" (GOOG-AT-MDL-015269020, at -030). Figure 50 shows that Google collects lower revenue shares for non-Open Auction transactions that it facilitates (i.e., Private Auction, Programmatic Guaranteed, Preferred Deals, and Open Bidding).

<sup>412</sup> See Exhibit 4. Figure 51 demonstrates that GAM ad server fees on an impression basis where product is Standard or Advanced Display have (on average) remained under [REDACTED] per thousand billed units since February 2017.

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customers paid no fees at all.<sup>413</sup> Moreover, some publishers that paid ad server fees did not pay for their first 90 million impressions served each month.<sup>414</sup> These data are consistent with internal documents.<sup>415</sup>

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<sup>413</sup> Figure 45 demonstrates that, from 2020 to 2023, over [REDACTED] of Google Ad Manager customers paid no ad serving fees.

<sup>414</sup> Google offers two types of accounts for use of its GAM (DFP) ad server: small business and premium (GAM360). Small business accounts may serve 90 million standard impressions for free and are generally are not charged ad serving fees on Google-sourced impressions (AdX and AdSense). *See* DoubleClick for Publishers, “DFP Small Business online standard Terms & Conditions,” available at: <https://www.google.com/doubleclick/publishers/small-business/terms/>. Accessed May 31, 2024 (“Using the Program, You are permitted to serve without being charged up to 90 million impressions per month to non-video ad units if You are located in the United States of America.”). Separate thresholds apply for video ad serving. GAM360 accounts receive no standard lump sum of “free” impressions but may not pay for ad serving on Google-sourced impressions. *See* Google Ads Manager Help, “Ad Manager billing setup,” available at: <https://support.google.com/admanager/answer/6214526>. Accessed August 6, 2024 (“[I]mpressions monetized by Ad Exchange or AdSense are not billed.”).

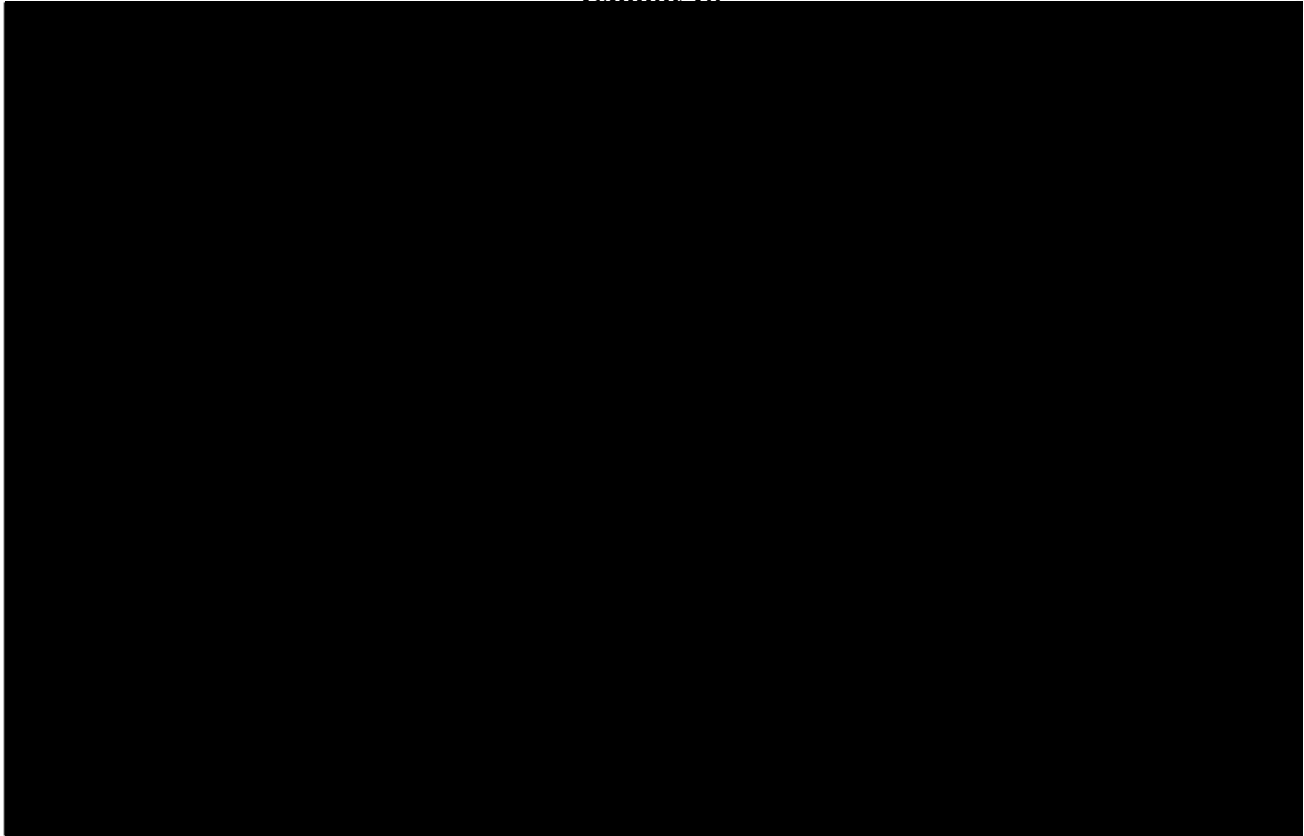
Google’s AdMob does not charge fees for mediation (e.g., serving mobile in-app ads). AdMob only earns revenue through ads it sells. Although AdMob mediation is free, some publishers use GAM to serve both their mobile app ads and their web-based ads and pay ad serving fees for these mobile in-app ads. *See* Google AdMob Help, “How AdMob works,” available at: <https://support.google.com/admob/answer/7356092>. Accessed July 16, 2024 (“Do I have to pay to use AdMob? No, using AdMob is free. Even better, Google and any third-party ad networks you use will pay you for clicks, impressions, and other interactions with the ads you display in your app.”); Google AdMob Help, “House ad,” available at: <https://support.google.com/admob/answer/3212684>. Accessed May 31, 2024 (“During AdMob mediation, you can traffic house ads using your own inventory free of charge.”).

*See* Google Ad Manager Help, “Compare Ad Manager, AdSense, and AdMob,” available at <https://support.google.com/admanager/answer/9234653>. Accessed May 31, 2024.

<sup>415</sup> GOOG-AT-MDL-008552137, at -152; GOOG-DOJ-13252505, at -506-508; GOOG-TEX-00441752, at -796. (“Overview of Pricing Structure. Free: 90M impressions cap.”).

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**Exhibit 18**



Notes: Data are limited to ads viewed by U.S. users. Excludes Open Bidding. Before July 8, 2014 Google did not record gross revenue data. *See* GOOG-AT-MDL-008932468, at -471.

Source: MDL RFP 243 AdX Data.

293) If Google had monopoly power in Professor Gans' candidate market for publisher ad servers for the sale of narrow display advertising and candidate market for ad exchanges for transacting indirect narrow display advertising, one would not expect to observe expanding output and increasing quality<sup>416</sup> with no corresponding increases in price. In my opinion, these data are inconsistent with Google having monopoly power and instead show a highly competitive industry.

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<sup>416</sup> I discuss ad tech quality in Section VIII.B.4.

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**C. Professor Gans' Conclusion that Google Has Monopoly Power Is Unreliable Even if We Accept His Relevant Markets Because His Analysis of the Indirect Evidence Is Incomplete and Is Based on Erroneous Assumptions**

294) Despite the availability of price, output, and quality data, Professor Gans instead relies only on structural characteristics of the ad tech industry, such as market shares and assertions about switching costs, data advantages, and entry and exit (i.e., indirect evidence), to conclude that Google has monopoly power in his candidate markets for ad servers, ad exchanges, and ad buying tools for small advertisers. In this section, I explain that Professor Gans' analysis of these structural characteristics is incomplete and based on erroneous assumptions, and that therefore his conclusion that Google has monopoly power in the three candidate markets is flawed and unreliable.

***1. Professor Gans' Market Share Figures Do Not Reflect Economic Constraints that Prevent Google from Exercising or Obtaining Monopoly Power***

295) Professor Gans purports to find high market shares in his candidate markets for publisher ad servers, ad exchanges, and ad buying tools for small advertisers. He concludes that these high market shares show that Google has monopoly power in each of these three candidate markets. As I explain in more detail below, these market shares are significantly overstated because they exclude key substitutes that compete against and constrain Google. But even assuming Professor Gans' narrow candidate markets are correct (which they are not), it is my opinion that Professor Gans' calculations of market shares in those markets is incomplete and depend on erroneous assumptions. I therefore conclude that Professor Gans' opinion that his market share analysis demonstrates that Google has monopoly power in any of his relevant markets is flawed and unreliable.

***a. High Market Shares Can Just as Easily Reflect Superior Price or Quality and Do Not Necessarily Demonstrate Monopoly Power***

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296) Professor Gans ignores that high market shares in his narrow candidate markets may stem from Google's superior mix of quality and price, or the breadth and depth of Google's offerings, and therefore are the result of competition on the merits. One must be cautious in using a company's share of impressions, revenue, or the value of ads to infer monopoly power.<sup>417</sup> For example, publishers sell ad inventory through billions of individual auctions in which multiple exchanges have opportunities to submit bids.<sup>418</sup> If a higher quality exchange wins a larger share of these auctions, this need does not imply it has monopoly power because it may simply reflect competition on the merits.<sup>419</sup>

297) This economic principle is well understood. For example, if five brands of candy bars are on display at the checkout of every grocery store in America, and one brand garners a share of 90 percent despite charging a higher price, one would be highly skeptical of the claim that it had monopolized the candy bar market. Every consumer that purchased a candy bar had the option of purchasing an alternative

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<sup>417</sup> For example, in a highly competitive bid process for a government contract, the winner may win a 100 percent share of the business. It would obviously be wrong to view the winner as a monopolist and view the competitive environment as lacking competition. The key determinant of competition is whether the winner competed vigorously against other bidders to win the business.

<sup>418</sup> The auction element of programmatic digital display ads—"the practice of automating media buying and creating digital ads with the use of marketing technology"—differentiates the analysis of competition among ad tech firms from standard analyses of monopolization. (Amazon Ads, "Programmatic advertising," available at: <https://advertising.amazon.com/blog/programmatic-advertising>. Accessed July 26, 2024.). For example, in a classic economic framework, market outcomes can often be reduced to a particular price (or set of prices) at which a particular good or service is sold. Programmatic ad sales, however, involve nearly instantaneous auctions occurring the moment an internet user's visit to a website triggers an ad query and in which the highest bid wins (regardless of quality or any other advantage its rival bidders may enjoy). Prices for each impression are therefore determined on an auction-by-auction basis, and the share of impressions a particular exchange wins depends on the level and volume of bids that advertisers choose to route through that exchange. See Google Ad Manager Help, "Glossary," available at <https://support.google.com/admanager/table/7636513>. Accessed August 6, 2024 (defining "Programmatic" as "automated, machine-based selections for purchasing display advertising.").

<sup>419</sup> If there are five exchanges that connect to all DSPs and publishers, economic theory indicates that, other things equal, competition among these exchanges would be intense. If one exchange is higher quality (more reliable in distributing payments, reduced risks of downtime, better at detecting fraud, handling rapid swings in capacity, low latency for responses, supports more cutting edge ad formats, better privacy protections, etc.), one would expect more advertisers/DSPs to favor routing bids through that exchange and more publishers to favor connecting their inventory to that exchange, other things equal. For instance, one of Google's customers reported moving their business to AppNexus due to Google lacking in "easily integrat[ing] publisher workflows into DFP." (GOOG-DOJ-02839847, at -853). Were this exchange to let its investments slip (resulting in more downtime, fraud, latency problems, etc.) DSPs and publishers could readily disconnect that exchange. Thus, market shares based on impression outcomes are not necessarily representative of actual competition (through innovation) to win the transactions of customers, and vigorous competition to maintain (or gain) a competitive advantage remains.

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product—and may well switch to another type of candy bar in response to a small price increase. However, the competitive investments this company made in producing and marketing its candy bar beat the investments of its competitors.

298) The same principle applies to competition for ad tech products.<sup>420</sup> For example, Exhibit 19 shows that between June 2018 and March 2023, the number of competing third-party exchanges appearing in Google data never fell below 40 when limited to Professor Gans' narrow definition of display ads. Just as shoppers may prefer one of the five candy bars, different publishers may prefer different exchanges because some exchanges offer a better mix of price and quality for their particular inventory. If a publisher engages with five exchanges to bid on its inventory, but more winning bids are submitted through Google's exchange than other exchanges, Google's market share will be higher (measured using impressions) even though the remaining four exchanges were each provided an opportunity to win each impression by submitting the highest bid.<sup>421</sup>

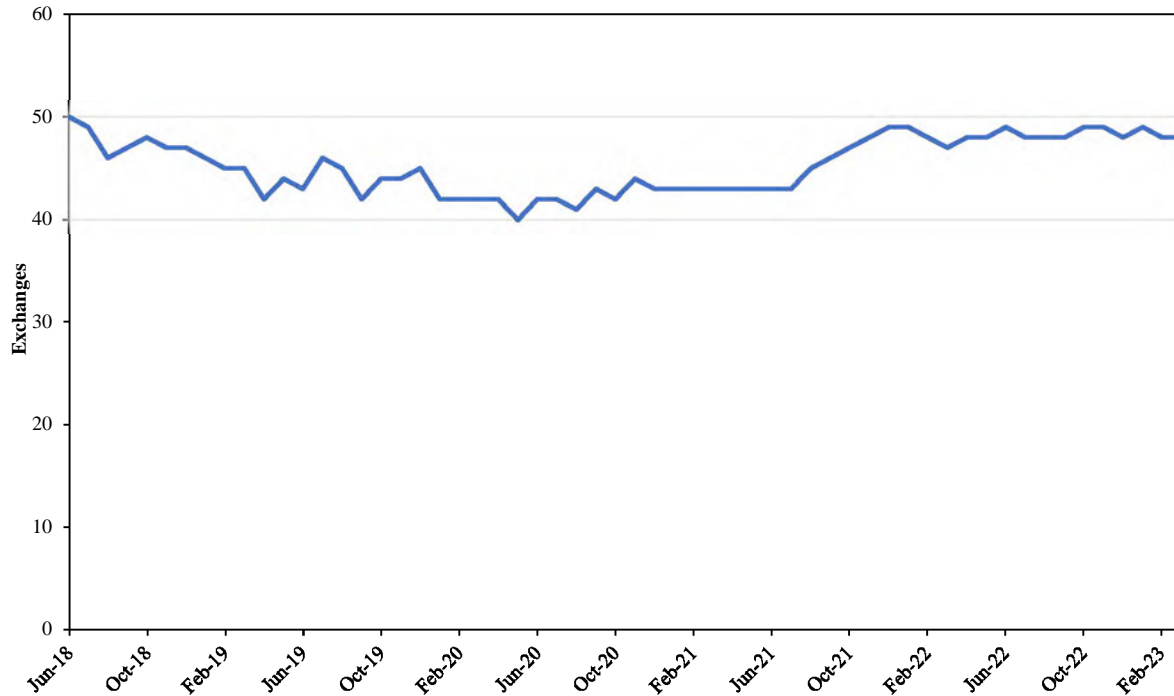
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<sup>420</sup> See Sections V.E, V.F, and VI.B.

<sup>421</sup> It is not uncommon for publishers to engage with more than five exchanges. The Dallas Morning News' ads.txt file indicates that it solicits bids through many different ad exchanges, including PubMatic, Index Exchange, OpenX, Triple Lift, Magnite (RubiconProject), Microsoft's Xandr (AppNexus), Sovrn (Iijit), and Google. Its ads.txt file lists over five dozen other ad-buying entities, including ad networks such as MGID. (The Dallas Morning News, "ads.txt," available at: <https://www.dallasnews.com/ads.txt>. Accessed May 31, 2024).

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**Exhibit 19**  
**Number of Open Bidding and Header Bidding Exchanges Used by DFP Publishers**  
**To Transact Display Ads (Narrow)**  
**June 2018 - March 2023**



Notes: Limited to exchanges that transact impressions viewed by users in the U.S. Unknown exchanges are grouped together as a single exchange.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

299) Advertisers and publishers similarly have access to and use a variety of different ad tech companies, including Google, Microsoft, Facebook, Amazon, The Trade Desk, FreeWheel and so on.<sup>422</sup> In short, vigorous competition need not result in uniform shares of impressions, clicks, ad spend, or publisher revenue across all ad tech companies.

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<sup>422</sup> This is because ad tech companies compete through product differentiation. For example, Google Ads markets its ability to pay for clicks as a strength of its platform, while FreeWheel emphasizes that its “TV and video advertising technology is built for today’s ever-evolving multiscreen ecosystem.” (Google, “Power your business by taking control of your budget,” available at [https://ads.google.com/intl/en\\_us/home/cost-tool/](https://ads.google.com/intl/en_us/home/cost-tool/). Accessed August 6, 2024; FreeWheel, “FreeWheel,” available at <https://www.freewheel.com/>. Accessed August 6, 2024). Plaintiffs’ candidate markets also distort measures of market shares.



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300) Professor Gans fails to examine whether the high market shares he purports to find for his candidate markets might be explained by Google offering customers higher quality products, better prices, or Google's efficiency. His failure to consider these alternatives is surprising, especially given the numerous alternative suppliers that exist for customers even within his narrowly defined candidate markets.

*b. Market Shares Do Not Reflect the Significant Role Multi-Homing by Advertisers, Publishers, and Users Plays in Constraining Google*

301) Google faces competition from a host of competitors even within Professor Gans' artificially narrow candidate markets.<sup>423</sup> In fact, as shown in this section, Google's customers frequently use multiple different ad tech providers—or “multi-home” on multiple providers' tools—to meet their needs. In this section, I show that advertisers frequently use multiple different ad buying tools and bid into multiple different exchanges to purchase digital display ads. I also show that publishers frequently use multiple different exchanges to send requests and accept bids for their ad inventory. Further, I show how publishers multi-home across tools, formats, and monetization strategies that have not been included in Professor Gans' candidate markets, and therefore are not captured by his market share analysis, but act as economic constraints on Google.

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<sup>423</sup> This phenomenon was studied by Ambrus, Calvano and Reisinger, who noted that “while Google can potentially deliver an advertising message to 93.9 percent of all internet users, even the smallest of the six networks (run by Yahoo!), can deliver a whopping 83.3 percent...a key feature of these markets: different outlets provide advertisers alternate means of reaching the same users.” (Attila Ambrus, Emilio Calvano and Markus Reisinger, “Either or Both Competition: A “Two-Sided” Theory of Advertising with Overlapping Viewerships,” *American Economic Journal: Microeconomics*, Vol. 8, No. 3, 2016, pp. 189-222, at p. 190.).

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302) It is well understood that in multi-sided markets, multi-homing is a more reliable indicator of lack of monopoly power than traditional market shares.<sup>424</sup> One recent article explained it this way:

“When users on different sides of the platform use only one platform to connect with each other, they are ‘single homing.’ When users can take advantage of multiple options to connect with each other, they are ‘multi-homing.’ The competitive implications are intuitive and straight-forward: a platform that provides the exclusive pathway for users on different sides to connect may be able to exercise ‘gatekeeper power’ and extract high fees; a platform that is just one of many possible connection pathways will face competitive pressure that forces it to charge competitive fees.”<sup>425</sup>

303) In my opinion, the implication of frequent multi-homing in ad tech is that Professor Gans’ market share figures understate the amount of competition Google faces in his candidate markets and overstate the difficulty customers have in switching between ad tech providers. The reason for this is straightforward. The presence of multi-homing means that advertisers and publishers can relatively easily switch between providers. For example, if an advertiser already uses another ad buying tool in addition to Google, the advertiser can relatively easily shift spend to that non-Google buying tool if faced with an increase in price or decrease in quality. In other words, multi-homing reduces the costs and hurdles for Google’s customers to move away from Google to its competitors. As a result, when there is multi-homing, market shares do not accurately reflect the range of alternatives (even within Professor Gans’ candidate markets) available to advertisers and publishers because market shares only count the tools used to buy or sell an impression. This undermines Professor Gans’ conclusion that he can infer that Google has monopoly power from his market share figures. To the contrary, multi-homing provides

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<sup>424</sup> “Not surprisingly, the price level tends to be lower with multihoming because the availability of substitutes tends to put pressure on the multi-sided firms to lower their prices.” (David S. Evans, “The Antitrust Economics of Multi-Sided Platform Markets,” *Yale Journal on Regulation*, Vol. 20, 2003, pp. 327-381, at p. 346).

<sup>425</sup> Ian Simmons, Sergei Zaslavsky and Patrick Jones, “Two sides to Every Story: Trying and Winning a Two-sided Market Case,” *Antitrust*, Vol. 38, No. 2, 2024, pp. 5-10, at p. 7.

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Google strong economic incentives to maintain and improve quality without raising prices so that it does not lose customers to rivals. In my opinion, the presence of such economic incentives is inconsistent with Google having monopoly power.

304) I note that, even in the absence of multi-homing (which appears to be the case with ad servers), the threat of repositioning and entry may prevent a firm from exercising monopoly power. As discussed in Section V.F.3 and V.F.6, historical episodes of rivals repositioning and customers developing in-house solutions likely constrain Google's ability to exercise monopoly power. For example, Google's top [REDACTED] of AdX publishers account for over [REDACTED] of AdX revenues and the top one [REDACTED] of DFP publishers account for almost [REDACTED] of DFP impressions. The risk of losing a portion of one or more of these customers' business—for example, as a result of a large publisher substituting to its own in-house solution or to a company that repositions to gain its business—constrains Google's ability to exercise monopoly power.<sup>426</sup> It is appropriate to consider these constraints and potentially include them in market share calculations, but Professor Gans does not do so.<sup>427</sup>

305) As discussed below, advertisers and publishers that use Google's buying tools and ad exchange in Professor Gans' candidate markets frequently multi-home on the ad tech products of rival companies. This multi-homing reduces the costs and hurdles for Google's customers to move away from Google to its competitors (switching costs) and constrains Google's ability to exercise monopoly power. Professor Gans does not consider that such multihoming might limit Google's ability to exercise

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<sup>426</sup> See Section V.E, Section V.F, VI.B.

<sup>427</sup> "Firms that are not currently active in a relevant market, but that very likely would rapidly enter with direct competitive impact in the event of a small but significant change in competitive conditions, without incurring significant sunk costs, are also considered market participants. These firms are termed 'rapid entrants.'" (Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at p. 49; see Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, 2010, at pp. 15-16).

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monopoly power. Nor does he consider the possibility that customers multi-home the ad tech tools of companies “outside” of his candidate markets that might reposition their offerings were Google to attempt to exercise market power.

306) Even ignoring repositioning and using Professor Gans’ narrow definition of display ads, data indicate that thousands of advertisers using Google Ads multi-home with one or more third-party buying tools.<sup>428</sup> Although data from AdX understate actual multi-homing by advertisers,<sup>429</sup> even these data show widespread multi-homing with Google Ads and rival ad buying tools. This multi-homing includes ad buying tools that Professor Gans asserts to be for “small advertisers” and buying tools he excludes from his narrow candidate market. For example, among ad buying tools Professor Gans names in his candidate small advertiser buying tool market, when limited to the purchase of display ads in the U.S., more than 16,188 advertisers choose to multi-home using Google Ads and at least one other third-

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<sup>428</sup> Figure 52 shows advertiser multi-homing from AdX data. These data understate multi-homing as they only cover advertisers’ use of third-party buying tools where (a) the advertiser uses the third-party tool to bid into AdX and (b) Google is able to infer the advertiser based on the creatives submitted for winning bids. Additionally, advertiser spend on Meta properties such as Facebook and Instagram are not visible in Google’s systems.

In AdX data, information about the third-party buying tools is obtained from the `ad_source_type` field. Third-party buyers that win auctions are identified in this field and generally can be divided into “Real Time Bidders” (“RTB”) and Open Bidding exchange bidders. There are three types of RTB bidders on AdX:

“Ad networks: companies that aggregate publisher ad space and sell it to advertisers opting to advertise in the space.

Trading desks: divisions at agency holding companies that execute exchange buys for all the company’s agencies.

Demand-side platforms (DSP): platforms that make buying across multiple exchanges easier and more transparent.” (Google Authorized Buyers Help, “Authorized Buyers overview,” available at: <https://support.google.com/authorizedbuyers/answer/6138000>. Accessed August 6, 2024).

<sup>429</sup> Using Google’s AdX data, one can infer multi-homing by observing that an advertiser is associated with Google Ads and another tool. However, one cannot infer that an advertiser “single-homes” on Google Ads based on AdX data alone. This is because (a) advertisers can buy ads on publishers’ websites using third-party buying tools by means that do not involve an AdX auction and (b) advertisers’ ad spend that crosses into Google’s ad tech via third-party exchange in Open Bidding does not identify the buying tool from which ad spend originated. As Open Bidding only identifies the exchange used by advertisers’ buying tools, and some unknown portion of this ad spend could arise from DV360 or Google Ads bidding into the third-party exchanges, I exclude all exchange bidding ad spend from this analysis of multi-homing.

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party buying tool.<sup>430</sup> For instance, more than 11,201 Google Ads advertisers multi-home with Microsoft's buying tool (Xandr; previously AppNexus), more than 9,845 Google Ads advertisers multi-home with Criteo, and more than 4,996 Google Ads advertisers multi-home with Yahoo's ad buying tool.<sup>431</sup>

307) These data also indicate that more than [REDACTED] Google Ads advertisers multi-home with The Trade Desk, more than [REDACTED] multi-home with Amazon's ad buying tool to purchase display ads on the open web, more than [REDACTED] advertisers multi-home with LinkedIn's ad buying tool, and more than [REDACTED] multi-home with Roku's Dataxu ad-buying tool, more than [REDACTED] advertisers multi-home with Comcast's Beeswax ad buying tool (which is offered by FreeWheel), as well as numerous other buying tools.<sup>432</sup> Although some of these multi-homing patterns involve open web display ad transactions that Professor Gans includes in his analyses of candidate markets for ad exchanges and publisher ad servers, they are purchased through ad buying tools that he excludes from his buying tool candidate market because he asserts that Google Ads' monopoly power over "ad buying tools for small advertisers" is not constrained by buying tools for "large advertisers" (The Trade Desk), walled garden platforms (Amazon), social media ads (LinkedIn), connected TV (Roku's Dataxu), and video ads (Comcast's FreeWheel Beeswax). That these advertisers use buying tools that Professor Gans excludes from his candidate market to place ads on the very same publishers' websites as Google Ads demonstrates that his analyses materially overstate the extent of Google's market power in his candidate markets. Professor Gans ignores that the

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<sup>430</sup> See Figure 52.

<sup>431</sup> See Figure 52.

<sup>432</sup> See Figure 52.

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demand for his ad buying tools is a derived demand for user impressions, and therefore that multi-homing on these alternatives constrains Google.

308) The volume of ad spend that multi-homers allocate to third-party ad buying tools is significant. For example, approximately [REDACTED] of advertisers that multi-home using Google's buying tools and third-party buying tools allocate at least [REDACTED] of their ad spend budget to third-party buying tools, and approximately [REDACTED] of advertisers in this group allocate at least [REDACTED] or more of their ad spend to third-party buying tools.<sup>433</sup>

309) These findings—that is, that advertisers multi-home across Google and third-party ad buying tools—are robust across other data sources in the record. For example, Google Campaign Manager data include display ad spending by federal and state government advertisers. Among federal and state government advertisers using Google Campaign Manager, [REDACTED] of impressions (using Professor Gans' narrow definition of display ads) purchased through Google Ads are bought by advertisers who also buy ads through DV360, a non-Google DSP, and direct deals. Almost [REDACTED] of Google Ads advertisers in the Campaign Manager data multi-home through at least one other channel,<sup>434</sup> and [REDACTED] of impressions (using Professor Gans' narrow definition of display ads) purchased through DV360 are bought by advertisers who multi-home across Google Ads, a non-Google

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<sup>433</sup> Figure 53 shows the breakdown of ad spending shares on third-party buying tools across multi-homing advertisers.

<sup>434</sup> See Figure 54.

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DSP, and direct deals.<sup>435</sup> Data also indicate that [REDACTED] of DV360 advertisers in the Campaign Manager data multi-home through at least one other channel.<sup>436</sup>

310) Advertisers also multi-home across ad exchanges. For example, Google Campaign Manager data indicate that advertisers (including federal and state government advertisers) bid into at least 35 third-party exchanges to buy display ads (based on Professor Gans' narrow definition), and six of these third-party exchanges received bids from over [REDACTED] of advertisers: Criteo, PubMatic, Magnite, Right Media (Yahoo), OpenX, and Xandr.<sup>437</sup>

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<sup>435</sup> See Figure 55.

<sup>436</sup> See Figure 55.

<sup>437</sup> Figure 56 summarizes the exchanges that DV360 customers bid into based on CM360 in discovery. CM360 data are only available for select advertisers.

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311) These multi-homing patterns are consistent with industry publications,<sup>438</sup> public views expressed by industry participants,<sup>439</sup> documents in the record,<sup>440</sup> cross-visitation patterns of users,<sup>441</sup>

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<sup>438</sup> For example, the Interactive Advertising Bureau (IAB) surveys members regarding their use of different methodologies for evaluating the effectiveness of advertising across channels. In a 2023 publication directed at retail media buyers, the IAB indicates: “To optimize performance and achieve business objectives, it is important to have fluidity in budget allocation both within and across accounts. Brands should be willing to allocate their resources where they have the best chance of performing based on the criteria.” (IAB, “Retail Media Buyers Guide July 2023,” available at: [https://www.iab.com/wp-content/uploads/2023/07/IAB\\_Retail\\_Media\\_Buyers\\_Guide\\_July\\_2023.pdf](https://www.iab.com/wp-content/uploads/2023/07/IAB_Retail_Media_Buyers_Guide_July_2023.pdf). Accessed April 30, 2024, at p. 7). “Brands should invest in a diverse media mix, considering the full scope of consumer ‘time spent’ to reach target audiences and measure retail outcomes.” (IAB, “Retail Media Buyers Guide July 2023,” available at: [https://www.iab.com/wp-content/uploads/2023/07/IAB\\_Retail\\_Media\\_Buyers\\_Guide\\_July\\_2023.pdf](https://www.iab.com/wp-content/uploads/2023/07/IAB_Retail_Media_Buyers_Guide_July_2023.pdf). Accessed April 30, 2024, at p. 36).

In a 2019 publication, the IAB examines views regarding advertising measurement models that, at their core, provide advertisers with a logical approach to leverage their multi-homing as a data source for repeatedly reallocating ad budgets to where they are most effective. In describing Marketing Mix Modeling (“MMM”), the IAB notes that “MMM attempts to answer questions such as: ‘What was the return on ad spend on mobile last year?’ and ‘What would sales be if we shift 10 percent of the budget allocation to addressable TV?’” These views are further supported by quotes from marketers characterizing the use of MMM and other methodologies precisely for the purpose of reallocating ad budgets to advertising channels that render the greatest returns. For example “We often might shift our spending based on information from MMM and also use this to justify advertising dollars for the next quarter or year.” (IAB, “The Essential Guide to Marketing Mix Modeling and Multi-Touch Attribution, An overview of industry viewpoints on measurement techniques November 2019,” available at: [https://www.iab.com/wp-content/uploads/2019/11/IAB\\_MMA\\_MTA-Guidebook\\_Nov-2019.pdf](https://www.iab.com/wp-content/uploads/2019/11/IAB_MMA_MTA-Guidebook_Nov-2019.pdf). Accessed February 27, 2024, at pp. 7, 15).

<sup>439</sup> For example, during the advertiser boycott of Facebook in 2020, the Wall Street Journal interviewed advertisers in relation to how they were adapting to the boycott. One interviewed advertiser, “[c]lothing and design brand Eileen Fisher Inc. said it would increase spending on current tactics such as using Google Display Network and Rakuten Inc., the Japanese online merchant, to attract new customers and re-contact existing ones with online display ads, for example.” (Nat Ives, “Where Advertisers Boycotting Facebook Are Spending Their Money Instead,” The Wall Street Journal, June 29, 2020, available at: <https://www.wsj.com/articles/where-advertisers-boycotting-facebook-are-spending-their-money-instead-11593467895>).

Likewise, the Dallas-based digital marketing agency AVX Digital, wrote on its official blog at the time: “Brands such as Ford, Starbucks, Levi’s, Adidas, NorthFace and more have jumped on the boycott bandwagon. As we wrap up the end of the month, over a thousand brands have participated in this movement to raise awareness and plea for action. Although this is not the first boycott against Facebook (previously seen in 2013 and 2017), this has been the largest and longest to date, as some brands have announced that they will continue the demonstration through the end of the year. While several of the participating companies have paused advertising spend on Facebook’s platforms, many have strategized to reallocate the available budget to other marketing channels. Below we have gathered only a handful of possible alternatives that can effectively and efficiently drive brand awareness at scale ... Google Display Network includes a multitude of advertising mediums that each have unique assets that can boost brand awareness and campaign engagement. Reaching around 90 percent of all internet users, Google Display Network should already be a significant element to most digital strategies.”

The agency also recommends other channels to which advertisers might redeploy their ad spend, including: Connected TV/OTT, Paid Search, Paid Social, and In-App Programmatic. The agency concludes with an answer to the question “So What Does This All Mean For Advertisers?” —including that “[t]here are a plethora of marketing channels that are very similar in layout, ad management, content, and ability to support various campaign objectives. Outside of these circumstances, it can always be beneficial to reevaluate your budget and reallocate to other mediums when opportunities arise.” (AVX Digital, “How Brands Are Adjusting Media Spend During the Facebook Boycott,” available at: <https://avxdigital.com/blog/how-brands-are-adjusting-media-spend-during-the-facebook-boycott/>. Accessed August 6, 2024).

<sup>440</sup>



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and direct evidence of advertiser substitution.<sup>442</sup> In sum, it is highly unlikely that Google could obtain or exercise monopoly power over advertisers using one or more components of its ad tech stack.

312) Publishers also multi-home across ad exchanges. In addition to indirect sale of impressions through Google, publishers frequently make their ad inventory available to multiple exchanges through standard waterfall prioritization on their ad servers;<sup>443</sup> through header bidding, in which multiple exchanges compete in real time for each impression; and through Open Bidding, in which AdX and other exchanges compete in real time on GAM. Even using Professor Gans' narrow definition of display ads, about 45 percent of publishers that sell impressions through AdX multi-home with at least one other exchange through header bidding or Exchange Bidding.<sup>444</sup>

313) Not only do publishers multi-home across multiple exchanges, many publishers do not use Google's ad exchange at all to sell their inventory.<sup>445</sup> Even using Professor Gans' narrow definition of

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<sup>441</sup> See Section V.F.5.

<sup>442</sup> See discussion of Simonson survey in Section VI.B.3.a.

<sup>443</sup> When remnant impressions become available under the waterfall mechanism, publishers specify an order for each demand source to be called and a reserve price for each demand source. The ad server calls demand sources for bids according to the publisher's order, and the ad server serves the ad of the first demand source that is willing to pay more than its reserve price.

<sup>444</sup> Figure 57 shows the number of publishers in DFP that single-home or multi-home on AdX and non-AdX exchanges through header bidding or Open Bidding.

<sup>445</sup> Publicly available sources, such as ads.txt, also allow one to identify publishers that earn revenue from one or more ad exchanges, none of which is Google's ad exchange.

For example, Instapundit.com, a website for a freelance columnist who has written for USA Today, Popular Mechanics, and the New York Post, runs many of Google's competitors on their website, but not AdX. These include Index Exchange, Rubicon, PubMatic, AppNexus, and OpenX. (Instapundit, "Other Writings," available at: <https://instapundit.com/other-writings/>. Accessed February 23, 2024; Internet Archive, "Ads.txt," available at: <https://web.archive.org/web/20231202003554/https://instapundit.com/ads.txt>. Accessed August 6, 2024).

Likewise, the website Texas Gun Trader earns programmatic ad revenue, does not use AdX, but does traffic its inventory through Index Exchange, AppNexus, and other exchanges. (Internet Archive, "Texas Gun Trader," available at: <https://web.archive.org/web/20210516092127/https://texasguntrader.com/>. Accessed August 6, 2024; Internet Archive, "Ads.txt," available at: <https://web.archive.org/web/20210519112503/https://texasguntrader.com/ads.txt>. Accessed February 23, 2024).

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display ads, data indicate that at least 1,400 publishers use Google's ad server to sell display ads through third-party ad exchanges via header bidding and do not sell their ad inventory through AdX.<sup>446</sup>

314) Publishers also multi-home across tools, formats, and monetization strategies that are outside of Professor Gans' candidate market. Because these alternatives constrain the hypothetical monopolist, they also constrain the individual competitors inside the candidate market, including Google, from exercising monopoly power. For instance, publishers inside Professor Gans' candidate ad exchange market also use ad networks to sell their ad space.<sup>447</sup> Data in the record confirm that since January 2017 about [REDACTED] of DFP publishers that sell ads through AdX or another exchange, also sell ads through network, direct deals, or sell ads outside of Professor Gans' narrow definition of display ads.,<sup>448</sup> and public data show that publishers who earn revenue from ad exchanges also can sell their ad inventory through ad networks.<sup>449</sup>

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<sup>446</sup> See Figure 57 (combining "Publishers who Single-Home on One Non-AdX Exchange" and "Publishers who Multi-Home using Non-AdX Exchanges").

<sup>447</sup> "Ad networks and ad exchanges share a similar purpose. Roughly speaking, they both gather free inventory from publishers in one place and offer it to advertisers for sale. Both can be integrated with demand-side and supply-side platforms, enabling programmatic ad buying and selling." (Irina Kovalenko, "Ad Network vs. Ad Exchange: Aren't They the Same Thing?" SmartyAds, December 7, 2018, available at: <https://smartyads.com/blog/ad-network-vs-ad-exchange-not-the-same-thing>).

"[B]ecause [ad exchanges] act as an open marketplace, they can do the work of multiple ad networks while giving advertisers a fair chance at bidding and purchasing available inventories ... Struggling to decide whether an ad network or ad exchange is the better fit for you? Consider picking both. Since ad networks and ad exchanges are a part of programmatic advertising, you'll benefit either way." (Brock Munro, "Ad Network Vs Ad Exchange: A Detailed Comparison," Publifit, March 20, 2024, available at: <https://www.publift.com/blog/ad-network-vs-ad-exchange#Ad-Network-vs-Ad-Exchange-Whats-the-Difference>).

<sup>448</sup> Figure 58 shows the number of publishers multi-homing across ad exchanges and other types of ad sales excluded from Professor Gans' narrow definition of display ads on ad exchanges.

<sup>449</sup> For example, the ads.txt file of online technology news website Wired indicates that it sells ad inventory through a variety of exchanges, such as TripleLift, OpenX, Index Exchange, and Google, as well as ad networks, such as Taboola. (See Wired, "ads.txt file for wired.com," available at: <https://wired.com/ads.txt>. Accessed March 29, 2024). The Dallas Morning News' ads.txt file indicates that it also sells its inventory through many different ad exchanges, such as PubMatic, Microsoft's Xandr (AppNexus), Sovrn (Iijit), and Google, as well as ad networks, such as MGID. (See The Dallas Morning News, "ads.txt," available at: <https://www.dallasnews.com/ads.txt>. Accessed May 31, 2024).

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315) Similarly, publishers using AdX routinely earn revenue from other types of properties and ad formats such as apps, CTV, video, and audio ads.<sup>450</sup> Data indicate that more than [REDACTED] of publishers using AdX earn revenue both from display ads included within Professor Gans' narrow definition as well as in-app ads, video ads, CTV ads, audio ads, and other formats and environments. Publishers using AdX to sell Professor Gans' narrow definition of display ads earn on average about [REDACTED] of their revenue from video and [REDACTED] of their revenue from in-app ads.<sup>451</sup>

316) Publishers using AdX also sell ads with direct deals. Direct deals for display ads on the web account for almost [REDACTED] of these publishers' impressions on DFP.<sup>452</sup>

317) Finally, publishers also multi-home across monetization strategies. Many publishers that monetize content by selling ad inventory using AdX and DFP also monetize content through

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<sup>450</sup> For example, video ads may feature on publishers' websites in much the same way that banner ads do. Figure 59 provides an example of a video ad appearing on a web publisher's article about a sports story alongside a banner ad.

<sup>451</sup> Figure 60 shows publishers multi-homing on AdX across narrow display ads as well as other ad formats and environments. The calculations in this figure ignore multi-homing associated with ad formats and environments that account for less than 0.5 percent of a publisher's revenue. Most publishers showed positive revenue across a relatively broad set of ad formats and environments while revenue for certain individual ad formats or environments could be *de minimis*. As I noted above, multi-homing indicates that the customer has already incurred certain costs associated with using alternatives to a putatively monopolized product and, thus, any amount of multi-homing may constrain the ability to exercise monopoly power.

<sup>452</sup> See also Exhibit 11, which shows the aggregate amount of display ads on DFP (using 'Professor Gans' narrow definition) attributable to direct deals and other demand sources. Publishers' data in the record indicates that they earn a substantial share of their revenue from direct deals. The share of revenue earned from direct deals varies across publishers and over time. [REDACTED]

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subscriptions and other means.<sup>453</sup> Newspapers, for example, earn their revenues from diversified sources, such as subscriptions.<sup>454</sup>

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<sup>453</sup> For example, Hulu offers a paid, ad-free version where users can watch anything “[f]rom current episodes and original series, to kids shows and hit movies,” or users can “[g]et [an] ad-free plan for only \$17.99/month.” Similarly, Disney+ offers an ad-free version for a higher price: “Disney+ Basic: Disney+ (With Ads) for the price of \$7.99/month[;] Disney+ Premium: Disney+ (No Ads) for the price of \$13.99/month[.]” (Hulu, “Stream Tons of Shows & Movies. Zero Ads,” available at: <https://www.hulu.com/no-ads>. Accessed August 2, 2024; Disney+, “Stream more of what you love,” available at: <https://www.disneyplus.com/>. Accessed August 4, 2024).

<sup>454</sup> WAN-IFRA, “World Press Trends Outlook 2022-2023,” World Association of News Publishers, available at: <https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/28263/world-press-trends-outlook-2022-2023-report%20%281%29.pdf>, at p. 21.

This is not unique to newspapers. Historically, subscription revenues account for about 40 percent of magazine revenues and advertising accounted for about 60 percent. “[A]lmost two-thirds of these magazines derived 60 percent or more of their revenues from advertisements. At the aggregate level, advertising revenues account for 63.31 percent of their total revenues.” (Michael Baye and John Morgan, “A simple model of advertising and subscription fees,” *Economics Letters*, Vol. 69, No. 3, 2000, pp. 345-351, at p. 345).

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318) These multi-homing patterns are consistent with public data,<sup>455</sup> industry publications,<sup>456</sup> public views expressed by industry participants,<sup>457</sup> documents in the record,<sup>458</sup> cross-visitation patterns of users,<sup>459</sup> and direct evidence of publisher substitution.<sup>460</sup>

319) In sum, multi-homing is extensive and this significantly constrains Google's ability to exercise monopoly power over advertisers and publishers using its buying tools or ad exchange. Google would risk shooting itself in the foot if it attempted to exercise monopoly power because advertisers, publishers and users have attractive alternatives they are already using.

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<sup>455</sup> The website [well-known.dev](https://well-known.dev) allows users to query lists of publishers for ads.txt validation based on complex filtering criteria. A query of active websites listing Google and at least one other top exchange finds over 240,000 publisher websites. The median number of ad systems that the top 20 (based on Tranco ranking) multi-homing publishers list as direct sellers of their inventory is 30. (Well-Known, "Well-Known Resource Index," available at: [https://well-known.dev/?q=status%3Aok+ads\\_system\\_direct\\_count%3A%3E2+%2Bads\\_system\\_direct%3Agoogle+ads\\_system\\_direct%3A%28rubiconproject+pubmatic+openx+appnexus+indexexchange+smartadserver+lijit+yahoo+sovrn+triplelift+spotxchange](https://well-known.dev/?q=status%3Aok+ads_system_direct_count%3A%3E2+%2Bads_system_direct%3Agoogle+ads_system_direct%3A%28rubiconproject+pubmatic+openx+appnexus+indexexchange+smartadserver+lijit+yahoo+sovrn+triplelift+spotxchange)). Accessed May 31, 2024; Victor Le Pochat, Tom Van Goethem, Samaneh Tajalizadehkhoob, Maciej Korczyński and Wouter Joosen, "Tranco: A Research-Oriented Top Sites Ranking Hardened Against Manipulation," available at: <https://tranco-list.eu/>. Accessed May 31, 2024).

<sup>456</sup> See WAN-IFRA, "World Press Trends Outlook 2022-2023," World Association of News Publishers, available at: <https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/28263/world-press-trends-outlook-2022-2023-report%20%281%29.pdf>, at pp. 26, 38. ("Although advertising and reader revenue are the leading income sources for our survey respondents, publishers are well aware of the need for diversification", "Success in this space requires a multi-stakeholder approach.").

<sup>457</sup> Ad tech company Sovrn indicates that "[a]s a publisher, diversifying your revenue streams can help to protect you from inevitable ebbs and flows across the industry. By tapping into a variety of income opportunities, you can ensure your earnings will be more sustainable over the long term." (Internet Archive, "The Why and How of Diversifying Your Revenue," available at: <https://web.archive.org/web/20231002045345/https://www.sovrn.com/blog/diversifying-your-revenue/>. Accessed August 4, 2024).

<sup>458</sup> In an internal strategy document from 2021, Google states that "[r]evenue diversification is increasingly important in the current market dynamics. There has been an increased focus on subscription growth as advertising revenue drops." (GOOG-AT-MDL-004300215, at -218).

<sup>459</sup> See Section V.F.5.

<sup>460</sup> SeekingAlpha changed from an ad-supported to a subscription-based revenue model: "Investing advice site SeekingAlpha.com said ... that it will stop running third-party advertising on its website. Advertising was 70 percent of its revenue at the end of 2019 and is still about 25 percent of its revenue, said CEO David Jackson... 'We're not shutting down ads because they are weak,' he added. 'On the contrary, the ad market is strong right now, and there's a lot of demand from advertisers to reach our audience... We can do this because we are profitable, are generating cash, and can be profitable with subscriptions alone,' he said." (Internet Archive, "Seeking Alpha to end third-party ads on site," available at: <https://web.archive.org/web/20221206213546/https://talkingbiznews.com/they-talk-biz-news/seeking-alpha-to-end-third-party-ads-on-site/>. Accessed August 3, 2024).

The New York Times decided to shift its focus to "primarily on readers. [Because of] the growth in [their][...] subscription revenue and the steady decline in advertising - as well as the changing nature of [their][...] digital operation," (The New York Times, "Innovation," March 24, 2014, available at: <https://nytcassets.nytimes.com/2024/04/InnovationReport.pdf>, at p. 60).

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**2. *Professor Gans' Market Share Calculations are Misleading and Incomplete Even Accepting His Characterization of the Candidate Markets***

**a. *After Correcting Professor Gans' Errors, Google's Share in His Candidate Ad Exchange Market is Modest***

320) According to Professor Gans' calculations, Google's share of his narrow candidate ad exchange market begins at about [REDACTED] in 2018, rises to [REDACTED], and then ends at [REDACTED] in 2022.<sup>461</sup> These calculations overstate Google's market share because of two errors. First, Professor Gans erroneously includes some impressions that third-party ad exchanges won as AdX impressions. This increases the numerator of his market share calculation, resulting in an overstatement of Google's share. Second, he fails to account for the full volume of impressions transacted by third-party ad exchanges (e.g., transaction volumes that are not observed in the Google data that he uses to calculate market shares). This reduces the denominator of his market share calculation, resulting in an additional overstatement of Google's share. These errors result in Professor Gans significantly overstating AdX's market share in his narrow candidate ad exchange market.

321) The first error Professor Gans makes is to treat impressions won by rival ad exchanges through Open Bidding auctions as part of Google's share.<sup>462</sup> Rival ad exchanges bid on impressions through header bidding and Open Bidding. Professor Gans treats the impressions that rival ad exchanges won as competitor transactions for some auctions (Header Bidding), but when these same rivals win

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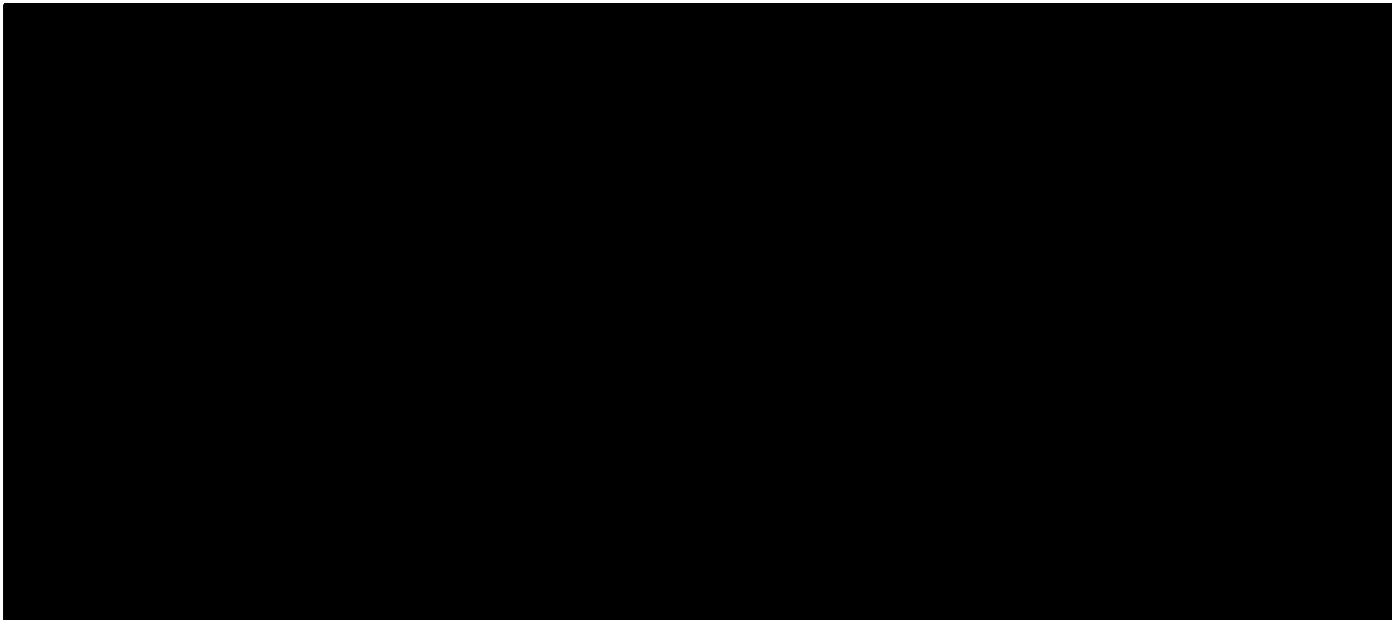
<sup>461</sup> See Gans Report, Table 5. Professor Gans calculates a market share for AdX in 2022 but does not report this in his Table 5. His backup materials indicate that his calculation of AdX's market share fell to [REDACTED] in 2022.

<sup>462</sup> Professor Gans' methodology indicates that "An impression is considered as an AdX impression if the column 'adx\_buyer\_category' is not equal to 'Non-Adx or Unmatched.'" (Gans Report, at fn. 428). In the "Header Bidding Monitor data that Professor Gans uses, Open Bidding transactions are identified where the column 'transaction\_type' equals "EBDA," which is the original acronym for Open Bidding (i.e., "Exchange Bidding Dynamic Allocation"). Professor Gans does not use the column "transaction\_type" in his calculations and these Open Bidding records are not excluded from his calculation of AdX impressions when he drops records where "adx\_buyer\_category" is "Non-Adx or Unmatched."

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Open Bidding auctions he treats their impression as if Google won the impression. Thus, the numerator of Professor Gans' market share overstates Google's impression volumes by the amount he erroneously attributes to Google. Row B of Exhibit 20 shows that, when I correct the numerator for this error, Google's market share in Professor Gans' narrow candidate market for ad exchanges falls by [REDACTED] [REDACTED] points in each year, and is below [REDACTED] in every year.<sup>463</sup>

**Exhibit 20**



322) The second error Professor Gans makes is to ignore information in the record about the actual volumes of impressions transacted by rival ad exchanges. Although several competing ad exchanges produced data, Professor Gans' calculation of AdX's market share in his candidate ad exchange market relies entirely on impressions observed in Google data alone.<sup>464</sup> Specifically, he calculates the AdX market share as the volume of impressions on AdX divided by the subset of

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<sup>463</sup> [REDACTED]

<sup>464</sup> Gans Report, at fn. 428.

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impressions that flow through Google's ad server as indirect sales of ads. Row A of Exhibit 20 shows that his calculation of Google's share begins at about [REDACTED] in 2018, rises to [REDACTED] and then ends at [REDACTED] in 2022.<sup>465</sup> His calculations assume that 100 percent of rival ad exchanges' impressions flow through DFP. However, comparison of the impressions recorded in Google data and the impressions recorded in third-party ad exchange data reveals that the Google data captures only a fraction of the impressions occurring on rival ad exchanges.<sup>466</sup> [REDACTED]

[REDACTED]

[REDACTED]

323) I use these third-party data to account for additional impressions won by competing ad exchanges. While Google data alone identify approximately 50 ad exchanges that transact Professor Gans' narrow definition of display ads, [REDACTED]

[REDACTED]. Because Professor Gans' methodology for calculating Google's share in his candidate small advertiser buying tool market (which I discuss below) acknowledges the need to account for data missing from rival businesses, I simply utilize Professor Gans' approach to estimating unobserved volumes from rival businesses to correct his estimate of AdX's market share. This amounts to incorporating the available third-party ad exchange impression volumes that he ignores into the

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<sup>465</sup> Professor Gans calculates a market share for AdX in 2022 but does not report this in his Table 5. His backup materials indicate that his calculation of AdX's market share fell to [REDACTED] in 2022.

<sup>466</sup> For comparison of the volume of impressions observed from data submitted into the record by third-party exchanges against the volume of impressions for the same ad exchange as observed in Google data as header bidding or Exchange Bidding, see [REDACTED]

[REDACTED]



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denominator of Professor Gans' market share calculation in his narrow candidate market for ad exchanges. I do this using two approaches that are consistent with Professor Gans' approach.<sup>467</sup>

324) The first approach to correcting the denominator only adds in additional impressions from third-party exchanges that submitted complete data over and above those accounted for in the Google data. This approach, therefore, adopts the strong assumption that third-party exchanges that did not submit data into the record transacted no volumes other than those observed in the Google data. This results in an "upper bound" for Professor Gans' calculation of AdX's market share.<sup>468</sup> [REDACTED] of Exhibit 20 [REDACTED]

325) My second approach to correcting the denominator is to also include an estimate of the volumes of third-party exchanges that did not submit data into the record.<sup>469</sup> This approach estimates

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<sup>467</sup> Professor Gans also presents his buying tool market shares as two scenarios. "In Figure 10, I present a lower bound for Google Ads' market share of impressions based on its share of AdX impressions transacted by ad buying tools for small advertisers (labeled Lower Bound). [...] The figure also shows how Google Ads' share of impressions changes if we relax the second assumption (Conservative Estimate), making it more consistence with the evidence, in a way that remains conservative." (Gans Report, at ¶394). I note that his first approach, applied to the AdX share, results in an upper bound estimate of Google's share.

<sup>468</sup> Any other methodology that estimates other rival exchanges to have some volume not captured by Google's systems will result in even lower Google shares. This correction merely accounts for the (complete) data that third parties submitted into the record. To avoid double-counting, for those exchanges that provide complete data, I subtract their (incomplete) volume from Professor Gans' denominator and then add to the denominator their (complete) volume of impressions based on their actual data. I do not make any additional changes to the volumes of rival ad exchanges that did not produce their own data. Because Professor Gans uses Header Bidding monitor data, the rival ad exchanges through Open Bidding is only specified in aggregate across all third-party exchanges. Other data that Professor Gans uses do identify rival exchanges by name for Open Bidding auctions. Additionally, Professor Gans' share calculation is for North American publishers [REDACTED] (Gans Report, at fn. 428. ("The geography of this dataset is restricted to North America.")). [REDACTED]

<sup>469</sup> Again, utilizing Professor Gans' methodology, I also correct his calculation of Google's share by incorporating a reasonable estimate of the unobserved volume of impressions not captured by Google's systems. I estimate the unobserved volumes of impressions on third-party exchanges by using the sample average proportion of the Google-observed impressions to the impressions observed in the data submitted by third-party ad exchanges. Google-observed impressions for third-party ad exchanges are those identified as participating in header bidding and Open Bidding in Google data.

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these unobserved impressions transacted by rival exchanges by assuming they have a similar proportion of unobserved-to-observed impressions, on average, as those observed [REDACTED]

[REDACTED] Exhibit 20 [REDACTED]

[REDACTED]<sup>470</sup> By merely correcting Professor Gans' calculations to appropriately account for the full volume of ad impressions transacted on rival ad exchanges, I find that Google's share in his narrow candidate ad exchange market is modest.

326) In short, correcting his errors (but using his market definition and methodology, which I do not endorse) results in an AdX market share of less than [REDACTED]

*b. After Correcting Professor Gans' Errors, Google's Share in His Candidate Small Advertiser Buying Tool Market Is Modest*

327) Professor Gans' calculations of Google Ads' market share in his candidate market for ad-buying tools for small advertisers also contain errors. Rather than calculating Google Ads' impressions as a percentage of total impressions from a broader set of businesses—as he did for his ad exchange shares—he calculates the Google Ads share as combination of several percentages, none of which are based on the total underlying volume of impressions sold by all small advertiser buying tools in his candidate market.<sup>471</sup> Review of Professor Gans' methodology reveals several flaws that render his results

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<sup>470</sup> See [REDACTED] for a visualization of the impact of corrections to Professor Gans' share calculations.

<sup>471</sup> As I mentioned in my discussion of Professor Gans' ad exchange share calculations, his methodology for small advertiser buying tool shares acknowledges that there exist unobserved volumes of impressions bought through rival buying tools. Professor Gans' "upper bound" share calculation assumes that 100% of ads in his narrow candidate market are captured by Google's systems and that indirectly transacted ads served by DFP publishers that do not go through AdX are purchased through rival small advertiser buying tools.

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unreliable.<sup>472</sup> Correcting only three of these flaws materially reduces the market shares that he calculates.<sup>473</sup> Additionally, as with his calculations of ad exchange market shares, his calculations of Google Ads' share in his candidate market are restricted to Google data alone.<sup>474</sup> That is, his calculations ignore information about transactions in his narrow candidate market that occur outside of Google. Therefore, his calculations are biased toward finding a high Google Ads market share.

328) Even accepting Professor Gans' approach to calculating Google Ads' share in his candidate market for buying tools for small advertisers, Google Ads' share is materially lower after correcting the flaws I described above. [REDACTED] shows that, using Professor Gans' methodology to compute market shares for companies in which third-party data were not available, in combination with third-party data, and consistently including firms in his candidate market during each year results in market shares that are materially lower than those he reports.<sup>475</sup> Simply incorporating third-party data into Professor Gans' own methodology significantly reduces Google Ads share in his candidate market to about [REDACTED] in 2018 and 2019, about [REDACTED] in 2020, about [REDACTED] in 2021, and below [REDACTED] in 2022. When

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<sup>472</sup> I also note that Professor Gans' Table 7 reports the years 2018 through 2021. However, his data and methodology allow for calculating 2022. In my analysis I correct this by reporting shares through 2022.

<sup>473</sup> The following are the flaws that I correct in his methodology: (1) Row [A] of Professor Gans' Table 7 indicates that it is the "AdX share of all indirect impressions" but his share includes more than AdX in their numerator. As I discussed above, his calculation of AdX's share assumes that third-party exchanges, bidding against AdX via Open Bidding, are part of AdX's share. I correct this mistake by excluding third-party exchanges from the numerator of his row [A]. (2) Rows [B] and [C] do not include the same list of rival small advertiser buying tools that he claims to compete against Google Ads in each year. Professor Gans cherry-picks companies to include in his Google Ads market share and includes some competitors in his candidate market in one year but excludes them in others. I correct this mistake by including the small advertiser buying tools he identifies in every year of his calculations. (3) Rows [B] and [C] ignore third-party data in the record on the full volume of impressions sold via the companies he identifies as small advertiser buying tools. I correct for this by substituting the incomplete volumes of rivals of Google Ads he identifies with the full data on their volumes provided in the record.

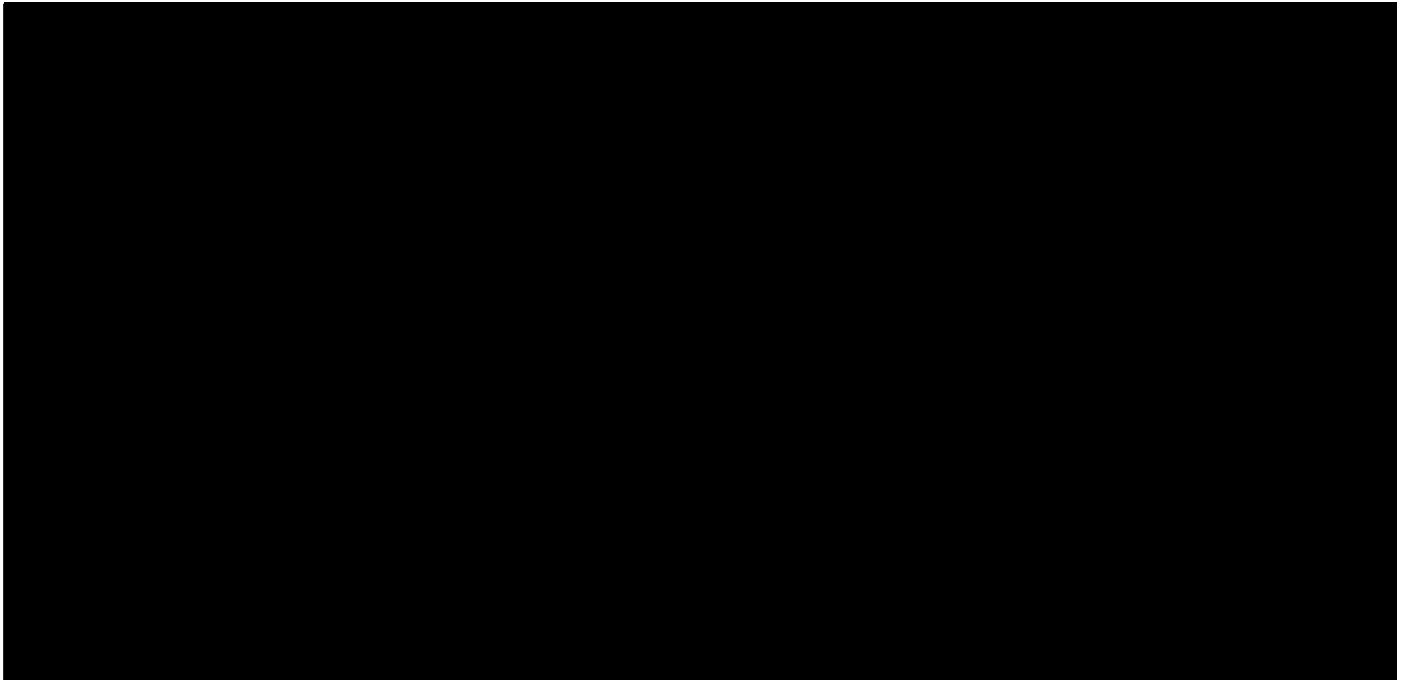
<sup>474</sup> Gans Report, Table 7.

<sup>475</sup> The corrections I implement include impressions from third-party data when available. For comparison of the impressions observed from data provided by third-party buying tools for small advertisers Professor Gans identified against the volume of impressions observed in Google data via their appearance as Real-Time Bidders on AdX, [REDACTED]

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I also correct his data to also separate third-party exchanges from Professor Gans' AdX share, I find that his own methodology produces even lower Google Ads shares in his candidate market: about [REDACTED] in 2018 and 2019, about [REDACTED] in 2020, about [REDACTED] in 2021, and about [REDACTED] in 2022. Additionally, I note that even these calculations are inflated because Professor Gans assumes there are only nine small advertiser buying tools in his candidate market.<sup>476</sup> In short, correcting his errors (but using his methodology, which I do not endorse) results in a Google Ads market share of less than [REDACTED]

**Exhibit 21**



*c. Professor Gans' Fails to Provide Economically Meaningful Measures of Google's Share in his Candidate Publisher Ad Server Market*

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<sup>476</sup> In Professor Gans' market share calculations, he includes Google Ads, Marketgid, Tell Apart, Netmining, ShareThis, Infectious Media IDM, Criteo, Yahoo, and Microsoft Xandr (formerly known as AppNexus). However, in the text of his report he also identifies Taboola as a small advertiser buying tools but does not use its data in his market share calculation (*See* Gans Report, at ¶229).

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329) Professor Gans' estimates of DFP's market share in his candidate ad server market are based on his erroneous use of documents. My review of the documents he relied upon indicates that they do not contain the information necessary to construct a reliable measure of Google's share of his candidate ad server market. More specifically, and as discussed in detail below, the market shares he reports are extracted from documents, but the shares in these documents are not market shares and, even if they were, the numbers do not correspond to the candidate market he has defined.

330) Professor Gans asserts that DFP has a share of [REDACTED] for 2018 and 2019 in his candidate publisher ad server market for the sale open web display inventory, but the document he references for this number indicates that these shares include in the numerator competitive alternatives to Google's ad server as well as publishers forgoing an ad server to connect directly with a demand source.<sup>477</sup> Specifically, the shares he claims to be Google's market share relate to the U.S. row of a table that describes these measures as the "Breadth" of the "Penetration Metrics" it reports.<sup>478</sup> This "breadth" is noted as the share of a selection of 328 "addressable" web domains that are running ads that are found to have either GFP tags (which relate to Google's publisher ad server), AdSense for Content "hardcoded," or Yavin.<sup>479</sup> The document shows that [REDACTED] of this selection of domains were under one of those three types. When AdSense is hardcoded, the publisher does not utilize an ad server to access demand. Yavin (or Ad Connector) refers to means by which Google provides direct access to Google Ads demand to publishers that use an in-house ad server. Professor Gans excludes these latter

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<sup>477</sup> Google is not the only ad tech business to allow publishers to directly connect with demand sources absent an ad server. *See, e.g.*, Taboola Dev Center, "Standard (aka JS Tag)," available at: <https://developers.taboola.com/web-integrations/docs/js-tag>. Accessed July 29, 2024.

<sup>478</sup> GOOG-NE-03467508 at -540.

<sup>479</sup> GOOG-NE-03467508 at -535.

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two types of publishers from his market, as he ignores publishers who choose direct connections with demand sources and he indicates that in-house ad servers are excluded from his market.<sup>480</sup> Thus, the [REDACTED] share to which he refers does not refer to Google's share in his candidate ad server market because the numerator of the share includes not only DFP but also direct connections to ad networks and publishers that already deploy in-house ad serving technology to connect with Google Ads demand.<sup>481</sup> The denominator of the share he uses is simply the number of web domains considered (328) and the document does not indicate whether these domains were selected randomly or for some other reason.

331) Professor Gans' assertion that Google held a [REDACTED] share of his candidate ad server market in 2017 is based on speculation as to the methodology utilized in calculating that share. Professor Gans attributes Google's 2017 ad server market share to a Facebook presentation slide referring to a prediction about 2022.<sup>482</sup> Professor Gans infers that Google's share in 2017 is [REDACTED]

[REDACTED]<sup>483</sup>

Although Professor Gans concedes in a footnote that "the geographical information for this market definition is unknown,"<sup>484</sup> he does not mention that the document also fails to indicate any metric or

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<sup>480</sup> "I conclude that in-house tools are not part of the relevant product market." (Gans Report, at ¶172.).

<sup>481</sup> Gans Report, at ¶353. ("For the years 2018 and 2019, DFP had a [REDACTED] share in terms of the number of addressable domains"); See GOOG-NE-03467508, at -540. Additionally, I note that the "breadth" calculation in this document is only a sample and there is no indication that the publishers included were randomly selected from a population of publishers in Professor Gans' candidate market. Indeed, the reference to LPS on this page may refer to "Large Partner Solutions," which is a label that Google applies to certain large relationships.

Because Professor Gans defines his markets around the locations of users, these shares do not reflect publishers in the geographic market he defines. Publishers around the world serve ads to U.S. users. The shares in his document that refer to global websites are much lower than those of the rows for U.S. publishers.

<sup>482</sup> Gans Report, at ¶353. ("An internal document from Facebook shows that DFP served [REDACTED] of web impressions in 2017, and they expected it to be [REDACTED] in 2022.").

<sup>483</sup> See [REDACTED]

<sup>484</sup> Gans Report, at fn. 378.

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methodology for arriving at these numbers.<sup>485</sup> Thus, the claim in his Figure 9 that his 2017 market share for Google is based on the share of impressions is speculative. Additionally, [REDACTED]  
[REDACTED].<sup>486</sup> Professor Gans asserts that in-house tools do not compete with Google's ad server,<sup>487</sup> whereas this document [REDACTED]  
[REDACTED]. Additionally, I note that there is nothing in this document to suggest that the share calculations align with Professor Gans' narrowly defined candidate ad server market.

332) Professor Gans' assertion that Google held a [REDACTED] share of his candidate ad server market in 2015 is taken from an informal email chain with no supporting methodology or data.<sup>488</sup> This email chain relates to a discussion following up from a business meeting in which the initiator of the chain argues for accelerating investment in DFP to allow publishers to integrate third party exchanges (which Google did with the launch of Open Bidding). The phrase that Professor Gans focuses upon indicates only that "Right now we are the defacto, preferred ad server of choice for [REDACTED] of publishers." There is no supporting material in the email, nor has Professor Gans identified other documents that link

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<sup>485</sup> Because no methodology is provided and the document does not indicate that the share is calculated from total web impressions, based on this document alone, one cannot rule out alternative explanations: e.g., that the shares relate to "addressable spend" as described on the following page, publisher counts, or a variety of other potential metrics and definitions of the "web" that may not overlap with Professor Gans' narrow candidate market for open web display ads. [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

<sup>486</sup> [REDACTED]  
[REDACTED]

<sup>487</sup> Gans Report, at ¶172.

<sup>488</sup> Gans Report, at ¶353, fn. 377.

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this number with his narrowly defined candidate market for ad servers for open web display inventory in the United States. Professor Gans also does not explain why the share of publishers who view DFP as their “defacto, preferred ad server” is a relevant measure of market share for evaluating monopoly power in his candidate market. Whatever the denominator of this [REDACTED] share may be, the subset of those publishers that view Google as their “defacto, preferred ad server” is not a recognized approach to evaluating whether a firm has obtained monopoly power.

333) Professor Gans’ claim that Google held an [REDACTED] share of his candidate ad server market in 2012<sup>489</sup> is taken from a document that expressly indicates this share excludes most of the publishers in Professor Gans’ candidate market. Specifically, Professor Gans relies on a Google presentation slide that indicates the reported “[REDACTED]” relates to the “DFP Premium Platform Footprint.”<sup>490</sup> As I discuss in Section X, a minority of publishers sign up for DFP Premium and those that do are larger publishers with greater means to develop their own ad serving technology. Thus, although the document does not indicate how the denominator associated with this [REDACTED] “platform footprint” was selected, it likely included only certain types of large publishers. Additionally, Professor Gans has not offered any opinion that supports the use of “platform footprint” as an appropriate measure of monopoly power in his narrow candidate market for ad servers for display ad inventory in the U.S. For this and many other reasons,<sup>491</sup> his interpretation of this number is speculative and inconsistent with the other shares he presents.

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<sup>489</sup> Gans Report, at ¶353. (“In 2012, Google reported it had a market share in terms of penetration amongst publishers in the U.S. at [REDACTED]”).

<sup>490</sup> GOOG-NE-13279022, at -028.

<sup>491</sup> For example: (A) The document does not indicate the metric used in the calculation of the [REDACTED] --i.e., whether it relates to counts of publishers, websites, impressions, overall ad spend, indirect revenue, site traffic, or any other metric among the numerous



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334) The document that Professor Gans' uses for his 2012 estimate of Google's share further reveals relevant economic context that supports my opinion that Google lacks monopoly power and is inconsistent with Professor Gans' conclusion that Google has monopolized his narrow candidate market. Specifically, the focus of the document concerns standardizing decision rules for the "[a]bility to waive DFP premium ad-serving fees for Google-monetized impressions (AdX, AFC, AdMob, Admeld)."<sup>492</sup> The logic expressed in the document reveals both the constraints that an integrated multi-sided platform faces when setting prices (at the time of this document, Google's integration of its ad tech stack was relatively recent) as well as the external pressures faced from rival ad servers and publisher outside options. For example, the document describes the negative consequences of double-marginalization: because the ad server fee induces publishers to choose settings that also result in lower auction prices, higher ad server fees can lead to lower Google revenue.<sup>493</sup> The document also points specifically to Google offering these terms to customers to win their business.<sup>494</sup> Even if Google had an [REDACTED] share of Professor Gans' candidate ad server market, making these offers of reduced prices in order to

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possibilities. (B) Professor Gans reports shares associated with global numbers in other documents. Because the "platform footprint" in all other countries is much lower than the U.S., his estimate for worldwide publishers (all of which may be serving ads to at least some U.S. users) would be substantially lower than [REDACTED] (C) The document does not specify which, if any, of the publishers in the "platform footprint" calculation and, thus, one cannot determine whether they are in Professor Gans' narrow candidate market. DFP Premium publishers can use the ad server for mobile in-app ads, video ads, and other display ads he excludes from his market. Thus, there is no link to the subset of display ads he asserts to be relevant.

<sup>492</sup> GOOG-NE-13279022, at -023.

<sup>493</sup> Charging both an ad serving fee and a revenue share "sometimes leads to inefficiencies such as the publisher taking the DFP tag off their ad units in order not to incur the ad-serving charge. The knock-on impact is bad for the publisher as they lose out on reporting, inventory forecasting etc, and bad for Google in that dynamic allocation is no longer available as an option for us to increase the value to the publisher and drive further monetization opportunities on other ad units." (GOOG-NE-13279022, at -029).

<sup>494</sup> Google indicates that the proposal to waive ad-serving fees "[i]ncreases DFP Premium competitiveness without affecting headline DFP rates." (GOOG-NE-13279022, at -029). The introductory slide that describes the status quo pricing of DFP lays out specific rival ad servers as the "Competition." (GOOG-NE-13279022, at -025). Google describes offers made with these reduced pricing terms, and that it still failed to win many accounts with these offers. (GOOG-NE-13279022, at -031).

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win (or retain) accounts would signal that it must bend to competitive pressures and, therefore, that market shares are a poor measure of monopoly power in this instance.

335) Professor Gans' assertions that Google held shares of [REDACTED] and [REDACTED] of his candidate ad server market in 2010 and 2011, respectively,<sup>495</sup> are again based on documents that expressly exclude most of the publishers in Professor Gans' candidate market. Specifically, the presentation slide that Professor Gans relies on indicates that the [REDACTED] share "reflects top 400 NA properties corresponding to [REDACTED] of market (excluding portals and Facebook),"<sup>496</sup> which means that these shares relate to a small subset of the publishers he claims to be in his candidate ad server market. My review of the document also reveals that Professor Gans has mischaracterized the shares and, again, I have identified several more inconsistencies with his narrow candidate market for publisher ad servers for display ads in the U.S. (details of which are in the footnote).<sup>497</sup>

336) Finally, I note that Professor Gans' assertions that Google held shares of [REDACTED] and [REDACTED] of his candidate ad server market in 2006 and 2008, respectively,<sup>498</sup> are similarly flawed. As he

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<sup>495</sup> Gans Report, at ¶353. ("DFP accounted for [REDACTED] of indirect ad spend from North American publisher websites ('domains') in 2010 and [REDACTED] in 2011.").

<sup>496</sup> GOOG-NE-01663183, at p. 34.

<sup>497</sup> For example, (A) Professor Gans does not disclose that the 2011 share he reports is a projection by the business in 2010. (B) Professor Gans asserts that "[t]he PowerPoint excludes text, mobile and video spend." (Gans Report, at fn. 375). While the ad spend chart on slide 33 indicates that it excludes these categories, he does not identify any information that links slides 33 and 34. Moreover, the second and third rows of the figure expressly refer to text ads which he claims to be excluded and there is no mention of excluding mobile and video ads. (C) Although Professor Gans' Figure 9 asserts that these shares are based on ad spend, the slides he references do not indicate that the publisher ad server shares are calculated based on ad spend. Indeed, the only mention of "spend" on slide 34 relates to an ad exchange "proxy" that appears on a different row of the figure than his ad server share. The [REDACTED] share could have been calculated based on publisher counts (relative to the 400 publisher sample indicated in the note), or it could have been calculated based on other metrics such as impressions. Nor does the presentation specify how the "[REDACTED] of market" statistic was calculated. (D) The geographic area of North America does not align with Professor Gans' geographic market definition and is inconsistent with the geographic area of the other shares he presents. (GOOG-NE-01663183, at -217).

<sup>498</sup> Gans Report, at fn. 370. ("DoubleClick had at most [REDACTED] market share and faced competition from 24/7 Real Media, with [REDACTED] market share, and Atlas, with [REDACTED] market share. The shares are calculated from firms' total revenue.").

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indicates, the share he calculates for 2006 departs completely from his calculations of all other shares by using company revenue, which can include a variety of other services.<sup>499</sup> Thus, his 2006 shares are not shares in his candidate market for ad servers for display ads in the U.S. The share he presents for 2008 is from a press article that does not, as his Figure 9 claims, calculate shares based on impressions. The article provides a caveat to the reader: “[i]t’s important to note that Attributor’s figures don’t represent the share of publishers each ad server works with; rather the company counted up all the ad-server calls across 75 million domains and then applied unique user numbers to those domains (using Compete.com data).”<sup>500</sup> That is, the methodology employed for Professor Gans’ market share 2008 yet again departs from all other share calculations he presents, his own characterization of the share, and the candidate market he defined.

337) The errors, inconsistencies, and mischaracterizations I have identified in Professor Gans’ document-based market share analysis undermine the entirety of his opinions on Google’s monopoly power in his candidate ad server market. Professor Gans has offered not a single market share within the candidate ad server market he defined. Not one of his numbers specifically compares Google’s ad server business against the overall market that Professor Gans defines, which is limited to his narrow definition of display ads in the U.S. Rather, Professor Gans’ report presents a small selection of numbers extracted from documents that create a pattern of shares above [REDACTED] and nothing to link these numbers in a systematic, scientifically replicable manner to shares in his candidate (or any other) relevant product

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<sup>499</sup> “Note that the revenue figures for DoubleClick and 24/7 RealMedia are for the respective companies’ entire revenue, including but not necessarily restricted to revenue from the provision of software tools.” (Gans Report, at fn. 381).

<sup>500</sup> Internet Archive, “Google Leads in Ad-Serving Share,” available at: [https://web.archive.org/web/20081223122936/http://adage.com:80/digital/article?article\\_id=133378](https://web.archive.org/web/20081223122936/http://adage.com:80/digital/article?article_id=133378). Accessed August 4, 2024.

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market. To illustrate some of the problems associated with Professor Gans' document-based approach, I note that the author who calculated the [REDACTED] market share that Professor Gans presents for 2008 also updated the share calculation in 2010 and showed DoubleClick at [REDACTED].<sup>501</sup> However, as I indicated above, Professor Gans presents a market share for DFP of [REDACTED] in 2010. Regardless, Professor Gans' conclusions regarding Google's market share in his candidate ad server market are inconsistent with the data patterns I summarized in Section V and examiner further in Section IX.

338) I conclude by noting that, while data in the record may not allow Professor Gans to reliably calculate Google's market share in his narrow candidate market for publisher ad servers, other data in the record indicates that significant volumes of ad server impressions may be contestable. Data indicate that the top one percent of DFP publishers account for almost [REDACTED] of DFP impressions. Thus, a rival ad server "outside" of his candidate market would only need to attract only a small number of publishers to achieve significant volumes.<sup>502</sup> As I have also noted, several large publishers have

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<sup>501</sup> Internet Archive, "Attributor Research Brief Web-Wide Ad Server Market Share Research: May 2010," available at: <https://web.archive.org/web/20101228184900/http://www.attributor.com/docs/AdServerMarketShareMay2010.pdf>. Accessed July 29, 2024. I note that I also do not endorse these calculations as market shares. The methodology of multiplying ad calls scraped from web crawling by unique users on websites does not appear to have been accepted by any market participants, may be susceptible to biased estimates depending upon the methodology for scraping and calculation of unique users, and has not been reviewed by any observers at the time to validate its reliability.

<sup>502</sup> Axel Springer, parent company of such websites as Business Insider, switched from DFP to AppNexus (now Xandr). Axel Springer touted the ease of switching platforms: "While digital publishers are frequently intimidated by the idea of changing their entire technology stack, our speedy implementation is proof that migrating ad servers isn't something to be afraid of - so long as you have the right technology partners at your side." (AppNexus, "AppNexus + Axel Springer," 2018, available at: [https://www.appnexus.com/sites/default/files/case-studies/Axel-Springer-Case-Study\\_0.pdf](https://www.appnexus.com/sites/default/files/case-studies/Axel-Springer-Case-Study_0.pdf). Accessed August 3, 2024, at p. 2).

Google documented that they have lost major accounts where publishers preferred AppNexus's features, pricing, or customer service over that which DFP offered, and actively examined ways to appeal to these publishers in the future. (GOOG-DOJ-02839847, at -852-853, -855). See GOOG-DOJ-04424050, at -051. ("Despite this weaker technological position, App[N]exus has had some important wins[.]").

In July 2022, Netflix announced that it will partner with Microsoft "to provide the advertising technology for the streaming service's planned ad-supported tier[.] ... Comcast's NBCUniversal subsidiary and Google were reportedly 'top contenders' to serve ads on Netflix before Microsoft won the contract." (Jon Brodtkin, "Microsoft wins deal to serve ads on Netflix, edging out Comcast and Google," Ars Technica, July 13, 2022, available at: <https://arstechnica.com/information-technology/2022/07/microsoft-wins-deal-to-serve-ads-on-netflix-edging-out-comcast-and-google/>).

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backward integrated by developing their own in-house solutions,<sup>503</sup> and the documents Professor Gans relies upon indicate that publishers exercise this option.<sup>504</sup> If one viewed some or all of volumes of the top one percent of publishers that control [REDACTED] of DFP impressions as potential competitors (e.g., “rapid entry” via in-house solutions or repositioning by ad tech companies he considers “outside” his narrow candidate ad server market ), Google’s market share in Professor Gans’ narrow candidate market for ad servers would be significantly lower. If all of these volumes were contestable, Google’s market share would be no greater than [REDACTED]. If only half of these volumes were contestable, Google’s market share would be no greater than [REDACTED]. In my opinion, Google’s pricing of DFP is more consistent with market shares in this range than those asserted by Professor Gans (although I do not endorse his framework).

**3. *Professor Gans Incorrectly Relies on Other Structural Characteristics to Conclude Google Has Monopoly Power in His Relevant Markets***

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<sup>503</sup> For example, Amazon, Meta, Disney, [REDACTED] For example, Disney’s proprietary ad server “gives the company greater flexibility and control, in order to prioritize delivery behavior for ad clients and its own business.” (Todd Spangler, “Why Disney Built Its Own Ad Server for Disney+ and Hulu – and What the YODA Does,” Variety, January 22, 2023, available at: <https://variety.com/2023/digital/news/disney-ad-server-tech-disney-plus-yoda-1235497663/>); Walmart developed its proprietary ad buying tool in collaboration with The Trade Desk, leveraging existing programmatic technology and Walmart’s first-party data. See Rich Lehrfeld, “Walmart Connect Launches Its New Demand-Side Platform, Walmart DSP, To Expand Its Off-Site Media Offerings at Scale,” Walmart, August 25, 2021, available at: <https://corporate.walmart.com/news/2021/08/25/walmart-connect-launches-its-new-demand-side-platform-walmart-dsp-to-expand-its-off-site-media-offerings-at-scale>. (“Walmart DSP is a first-of-its kind demand-side platform that was built in partnership with the world’s leading independent DSP, The Trade Desk. ... Unlike other DSP products in the market, our standalone platform combines the best-in-class technology and performance of The Trade Desk with the robust scale of Walmart’s unparalleled first party omnichannel data.”). See also Amazon, “Ad tech solutions,” available at: <https://advertising.amazon.com/adtech-solutions>. Accessed April 26, 2024 (“Our suite of ad tech solutions, including Amazon DSP and Amazon Marketing Cloud, help brands and advertisers reach their marketing goals, on Amazon and beyond.”); Meta, “Move your business forward with Meta technologies,” available at: <https://business.meta.com/>. Accessed April 26, 2024 (“Move your business forward with Meta technologies. Unlock your potential with marketing tools and ad solutions that take your business to the next level. Start advertising across Facebook, Messenger, Instagram, WhatsApp and more.”); [REDACTED]

<sup>504</sup> See FBTEX-00482536, at-550; GOOG-NE-03467508, at -535.

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339) Professor Gans also purports to examine other structural characteristics (i.e., indirect evidence) in addition to market shares that he believes indicate that Google has monopoly power in his candidate markets for ad servers, ad exchanges, and ad buying tools for small advertisers.<sup>505</sup> He offers opinions as to the implications of data advantages, the history of entry and exit, and switching costs for his analysis of monopoly power.<sup>506</sup> In this section, I explain why Professor Gans' analysis of these structural characteristics is incomplete and based on erroneous assumptions and therefore that his conclusions about monopoly power are flawed and unreliable.

340) First, Professor Gans asserts that Google's "data advantage" creates a barrier to entry in his candidate market for publisher ad servers used for the sale of open web display ads.<sup>507</sup> For instance, according to Professor Gans, "[p]ublisher ad servers need to acquire data to facilitate the ad selection process and enable publishers to manage and control their inventory."<sup>508</sup> But Professor Gans provides no economic analysis to show that the lack of data has deterred potential entry, or that it has led to exit in his purported publisher ad server market.<sup>509</sup> The only evidence that Professor Gans cites to support this opinion is the testimony of two of Google's current competitors, who bemoan Google's superior data capabilities.<sup>510</sup> The superior quality and breadth of Google's data capabilities demonstrate its history

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<sup>505</sup> See Gans Report, at Sections V.A.2-6.

<sup>506</sup> See Gans Report, at Sections V.A.2-6, V.B.

<sup>507</sup> Gans Report, at ¶¶363-366.

<sup>508</sup> Gans Report, at ¶363.

<sup>509</sup> This lack of evidence linking Google's purported data advantage to lack of entry is consistent with the economic literature. See, e.g., Anja Lambrecht & Catherine E. Tucker, "Can Big Data Protect A Firm from Competition?," *CPI Antitrust Chronicle*, January 2017; Catherine E. Tucker, "Online Advertising and Antitrust: Network Effects, Switching Costs, and Data as an Essential Facility," *CPI Antitrust Chronicle*, April 2019.

<sup>510</sup> Gans Report, at ¶363, fn.405, ¶364, fn. 408, fn. 410 (Deposition of Kenneth Katzgrau (BroadStreet Ads) on May 23, 2024 (hereafter "Katzgrau (BroadStreet Ads) Deposition"); ¶406 (Deposition of John Dederick (The Trade Desk) on July 28, 2023, TTD\_TR\_00000001).

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of innovating in the ad tech space and that Google's success with data is a competitive outcome in which one firm gains business at its competitors' expense. I examine this in more detail in Section VIII.

341) Professor Gans does not appear to consider the possibility that Google's purported "data advantage" related to the DFP ad server may be a consequence of Google's investments to improve the quality and performance of its product. Such investments are procompetitive and result in higher levels of customer satisfaction, and thus higher demand for the product.<sup>511</sup> The fact that Google's continuous efforts to improve its DFP ad server has helped it to gain significant scale in the ad tech line of business does not mean that the associated "data advantage" in itself creates market power. To the contrary, a market characterized by continuous product improvements to meet customer demand is consistent with competition. Professor Gans provides no quantitative assessment of what it would have cost an ad tech firm to grow its customer base to allow it to overcome Google's purported "data advantage" and be able to compete in the market for ad servers. Nor does he describe the minimum viable scale of the customer base and data needed to market an ad server that would be capable of offering publishers options to fill open ad space with a wide variety of types of digital ads inventory.

342) Second, Professor Gans claims that the absence of entry in his candidate market for publisher ad servers used for the sale of open web display ads is an indicator of barriers to entry.<sup>512</sup> But Professor Gans does not examine the economic incentives faced by potential entrants to the purported publisher ad server market. Any potential entrant to the market of ad servers identified by Professor Gans would have to compete for a share of publishers who use Google's DFP server based on a combination

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<sup>511</sup> See Section X.D.3.

<sup>512</sup> Gans Report, at ¶367.

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of price and quality. However, Google charges the vast majority of publishers zero fees for serving ads with its DFP ad server.<sup>513</sup> Professor Gans does not assess whether firms might find entering a market where the price is competitive not worth the upfront investment of developing an ad server to compete with Google's DFP server. Professor Gans therefore has no basis to assert that it is entry barriers that prevented additional firms from entering the purported publisher ad server market, as opposed to those firms' assessment that there are few profitable opportunities in the ad serving business against a high-quality competitor. Professor Gans also failed to analyze data to determine whether entry, repositioning by ad tech companies he excludes, or contestable volumes create a sufficient competitive constraint for Google to keep DFP prices low while continually investing in quality.

343) Third, Professor Gans asserts that advertisers and publishers face high costs when switching to non-Google products in his candidate markets for publisher ad servers and ad buying tools for small advertisers for transacting open web display ads.<sup>514</sup> Professor Gans did not consider that multi-homing is indicative of low switching costs. Nor did he cite to evidence that publishers or advertisers are unaware the high switching costs he asserts prior to deciding which ad server or ad buying tool to use. Nor has Professor Gans shown that there are "significant" information costs preventing advertisers and publishers to factor the purported switching restrictions in their decision to use Google's products. Switching costs therefore are not a barrier to competing for publishers' or advertisers' business at the time they are deciding which server or ad buying tool to license.<sup>515</sup> Moreover, while Professor Gans

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<sup>513</sup>As shown in Figure 45, from January 2020 to June 2023, [REDACTED] of DFP publishers paid no server fees.

<sup>514</sup> Gans Report, at ¶¶357-362 (discussion about ad servers); ¶¶398-402 (discussion about ad buying tools for small advertisers).

<sup>515</sup> See Carl Shapiro, "Aftermarkets and Consumer Welfare: Making Sense of Kodak," *Antitrust Law Journal*, Vol. 63, 1995, pp. 483-511.



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argues that advertisers and publishers face barriers when switching to non-Google products due to the cost of migrating, he has not shown that the purported switching costs are substantial enough to lock-in Google's customers. To the contrary, most advertisers and publishers use multiple products (both Google and non-Google) to meet their needs, demonstrating that switching costs are not an impediment to using non-Google products. To the extent any Google customers may have little incentive to switch to other products, that may be because they are highly satisfied with the product and not because of any purported switching costs.

344) With respect to the candidate market for ad exchanges, Professor Gans claims it has high entry barriers due to indirect network effects.<sup>516</sup> Professor Gans asserts that strong indirect network effects create barriers to entry and give Google market power. The reasoning is incomplete. The indirect networks he identifies are associated with thicker markets: bringing more advertisers and publishers on board creates a more valuable platform because there are more potential trading partners and, hence, more efficient matches. Other things equal, this would induce customers to be attracted to platform, increase output (matches) and increase its market share. The exercise of market or monopoly is associated with raising prices or, alternately, reducing output or quality. There is no evidence of this. To the contrary, there is evidence that the benefits of the larger pie associated with greater output and thicker markets have been passed on to customers.

345) Moreover, data indicate that at least 65 ad exchanges have competed with AdX through header bidding or Open Bidding since 2018.<sup>517</sup> This directly contradicts Professor Gans' conclusion that

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<sup>516</sup> Gans Report, at ¶¶377-389.

<sup>517</sup> See Figure 9 and Section V.F.2.

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his relevant market for ad exchanges has high entry barriers due to indirect network effects.<sup>518</sup> Similarly, the increase in the number of publishers selling their inventory through a variety of third-party ad exchanges (as discussed in Section IX.C) indicates that the indirect network effects discussed by Professor Gans do not prevent entry and do not protect Google from the competitive pressure of new entry.

346) Professor Gans further argues that the market for ad buying tools for small advertisers has high entry barriers due to switching costs and data advantages.<sup>519</sup> However, what Professor Gans claims to be barriers to entry—switching costs and data advantages associated with Google Ads—could stem from Google’s successful investments in quality and innovation to attract customers, which are procompetitive. While Professor Gans claims that the purported ad buying tools for small advertisers market features barriers to entry and requires a minimum scale to be profitable, he has not identified how many customers are needed to achieve sufficient scale, nor does he provide an analysis to estimate the relevance of these barriers or economic evidence to support his claims.<sup>520</sup> Moreover, there are no obvious barriers that would prevent rival ad buying tool providers from repositioning or expanding their output if Google attempted to exercise monopoly power. The online platform world is not like brick-and-mortar retailing: output expansion does not require building and staffing new physical facilities.

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<sup>518</sup> Gans Report, at ¶¶377-389.

<sup>519</sup> Gans Report, at ¶403.

<sup>520</sup> Gans Report, at ¶383. (“Thus, as more participants join each side of the market for ad exchanges for transacting indirect open web display advertising, the value of an ad exchange grows for both publishers and advertisers, creating indirect network effects. This can raise the level minimum efficient scale at which new entrants can achieve post-entry profit.”); Gans Report, at ¶405. (“An ad-buying tool cannot achieve sufficient scale unless it can assemble a large number of customers and then develop algorithms that successfully bid on inventory.”).

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347) Further, Professor Gans does not establish that the type of switching costs discussed in his report would prevent any advertisers from switching their ad buying tool, as his discussion is not grounded in any analysis of the preferences of advertisers in his relevant market for ad buying tools for small advertisers.<sup>521</sup> For example, Professor Gans cites a study by Competition and Markets Authority and concludes that “that multi-homing is rare for small advertisers.”<sup>522</sup> However, data in the record shows that this is not the case. As discussed in Section VII.C.1, advertisers frequently buy ads through both Google Ads and at least one more third-party ad buying tool, which indicates that advertisers frequently multi-home across buying tools.

348) Professor Simonson’s survey results are consistent with my independent data analyses and conclusions that advertisers frequently multi-home across buying tools. Similar to actual data, [REDACTED]  
[REDACTED]  
[REDACTED].<sup>523</sup> [REDACTED]  
[REDACTED]  
[REDACTED].<sup>524</sup> These patterns are inconsistent with Professor Gans’ assertion that the ad buying tool market for small advertisers has high entry barriers due to switching costs, but instead indicate that advertisers are well positioned to divert ad

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<sup>521</sup> Gans Report, at ¶¶398-402.

<sup>522</sup> Gans Report, at ¶399.

<sup>523</sup> See [REDACTED]  
[REDACTED]

<sup>524</sup> See [REDACTED]  
[REDACTED]

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spend if Google were to increase price in Professor Gans' narrow candidate market for small advertiser buying tools.

***4. Professor Gans' Claim that Google Has Monopoly Power in His Relevant Markets Ignores Google's Incentives as an Integrated, Multi-Sided Platform***

349) Because Google is an integrated, multi-sided platform that competes with other integrated and non-integrated companies that also produce matched impressions, it has a strong economic incentive to charge prices below the monopoly prices Professor Gans asserts Google can charge in his standalone candidate markets.<sup>525</sup> These incentives arise not only because a multi-sided platform must delicately balance the interests of advertisers and publishers<sup>526</sup> to create a matched impression with a user, but because losing customer in one of Professor Gans' candidate markets would jeopardize the gross profit margin associated with that customer across all other components in the ad tech stack. Google has an economic incentive to ensure the satisfaction of its customer base because it internalizes externalities<sup>527</sup> across its ad tech stack, and the environment in which it sets fees is subject to indirect network effects. Moreover, raising prices can cause reputational harm that can negatively affect sales of Google's ad tech products within its current and potential customer base. Indeed, Google documents reflect that Google,

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<sup>525</sup> See Section V.E and Section VI.A.4, above.

<sup>526</sup> "A platform needs to figure out how to get enough of both types of participants to join. As they mature, platforms must balance the interests of both groups, because business decisions that affect the value to one group from using the platform affects the value to the other group." (David Evans and Richard Schmalensee, *Antitrust analysis of platform markets: Why the Supreme Court got it right in American Express*, Competition Policy International, 2019, at p. 12).

<sup>527</sup> In Section VIII.B below, I explain the economic reasoning in more detail.

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as an integrated supplier,<sup>528</sup> accounts for the impact of its decision making on all sides of the multi-sided market in which it operates<sup>529</sup> and on the web ecosystem as a whole.<sup>530</sup>

350) Professor Gans not only ignores how integration and indirect network effects constrain Google's ability to exercise monopoly power, but fails to recognize the benefits customers enjoy as a result of these incentives. For example, [REDACTED] of publishers who use DFP pay zero fees for ad serving. In contrast, Taboola's buying tool offers advertisers the ability to spend on cost per click ("CPC") campaigns like Google Ads, but does not offer a supply chain that is integrated with an ad server, and it charges higher fees than Google Ads.<sup>531</sup> [REDACTED]

[REDACTED]

[REDACTED]<sup>532</sup> [REDACTED]

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<sup>528</sup> For example, one Google document describes Google's approach to its ad tech stack as taking a "[b]alanced [f]ocus [...] on both the buy and sell sides [...] enabl[ing] [its] partners to maximize yield and efficiency without increasing operating costs" through "[s]table [t]echnology and [f]ull [s]tack [i]ntegrations" and providing "unmatched commitment and investment in protections for users, sellers and buyers." (GOOG-DOJ-11357824, at -828).

<sup>529</sup> For example, one Google document describes Google's incentives to "strike a careful balance between maximizing outcomes for advertisers, creating yield for publishers, and providing delightful ad experiences for consumers if [Google is] going to help sustain an ad-supported ecosystem." (GOOG-TEX-00656701, at -800).

<sup>530</sup> For example, one Google document indicates that "[a]s a technology provider for both buyers and sellers, Google is committed to helping the industry evolve while maintaining a healthy and growing programmatic ecosystem." (GOOG-TEX-00110023, at -025).

Google's publisher policies indicate that "Google helps to enable a free and open internet by helping publishers monetize their content and advertisers reach prospective customers with useful, relevant products and services. Maintaining trust in the ads ecosystem requires setting limits on what we will monetize... If you fail to comply with these policies, we reserve the right to disable ad serving on your site or disable your account at any time." (Google AdMob Help, "Understand the Google Publisher Policies and Google Publisher Restrictions," available at: <https://support.google.com/admob/answer/10022365>. Accessed May 31, 2024).

<sup>531</sup> Taboola retained nearly 40 percent of ad spend paid by advertisers to cover its costs and earn a profit margin. For the nine months ending September 30, 2022, Taboola indicates \$1,029,883,000 in revenue and paid \$619,109,000 in "traffic acquisition cost." Therefore, Taboola retained about 39.9 percent [= (\$1,029,883,000 - \$619,109,000) / \$1,029,883,000] of advertisers' ad spend. (Taboola, "Q3 2022 Shareholder Letter," available at: <https://investors.taboola.com/static-files/33b41a2c-d320-4656-b714-facc711f7402>. Accessed February 26, 2024, at p. 10; Taboola Help Center, "Setting Your Bid Strategy: Enhanced CPC," available at: <https://help.taboola.com/hc/en-us/articles/360008291014-Setting-Your-Bid-Strategy-Enhanced-CPC>. Accessed August 6, 2024).

<sup>532</sup> [REDACTED]

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[REDACTED].<sup>533</sup> AdButler's supply chain is integrated across an ad network and its ad server businesses, but not across an ad exchange or buying tool, and it charges higher fees than Google for ad serving.<sup>534</sup>

351) In asserting that Google exercises monopoly power, Professor Gans also ignores that Google provides other valuable services to advertisers and publishers at no charge when a monopolist would not have an incentive to do so. Examples of these services include systems to evaluate the quality of website traffic,<sup>535</sup> tools to diagnose the efficiency of website code for calling ads,<sup>536</sup> tools to analyze data to help make business decisions,<sup>537</sup> and tools to produce content and ads.<sup>538</sup> These and other procompetitive benefits stem from Google's operation of an integrated ad tech stack.

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<sup>533</sup> [REDACTED].

<sup>534</sup> AdButler posts prices for three tiers of its ad serving products. The lowest per-unit cost plan is the most expensive tier listed, starting at \$2,988 per month for 50 million ad requests and no free impression threshold is identified. This translates to about \$0.06 on a CPM basis [= \$2,988/(50,000,000/1,000)]. (AdButler, "Pricing," available at: <https://www.adbutler.com/pricing.html>, accessed August 6, 2024). By comparison, as I showed in Section V.C, DFP ad server fees have been declining over time and now stand on average around \$0.022 per thousand impressions.

<sup>535</sup> These products are a part of the Google Marketing Platform for Small Businesses, which encompasses Google Tag Manager and Google Analytics. *See* Google Marketing Platform, "Easy-to-use tools for your business," available at: <https://marketingplatform.google.com/about/small-business/>. Accessed February 26, 2024; Google Marketing Platform, "Tag Manager: Tag management made easy," available at: <https://marketingplatform.google.com/about/tag-manager/>. Accessed February 26, 2024; Google Marketing Platform, "Analytics: Get essential customer insights," available at: <https://marketingplatform.google.com/about/analytics/>. Accessed March 29, 2024.

<sup>536</sup> These products include Google Lighthouse and PageSpeed Insights. *See* Google for Developers, "Publisher Ads Audits for Lighthouse," available at: <https://developers.google.com/publisher-ads-audits/>. Accessed August 6, 2024; PageSpeed Insights, "Make your web pages fast on all devices," available at: <https://pagespeed.web.dev/>. Accessed February 27, 2024.

<sup>537</sup> Looker Studio, "Overview," available at: <https://lookerstudio.google.com/overview>. Accessed April 2, 2024; Google Cloud, "Looker Studio," available at: <https://cloud.google.com/looker-studio>. Accessed August 4, 2024.

<sup>538</sup> These are part of the Chrome Web Developer Tools for Publishers and include Web.dev, DevTools, and Google Web Designer. Web.dev, "Building a better web, together," available at: [web.dev](https://web.dev). Accessed April 2, 2024; Chrome for Developers, "DevTools," available at: <https://developer.chrome.com/docs/devtools>. Accessed February 27, 2024; Google Web Designer, "Create engaging videos, images, and HTML5-based designs for your business that can run on any device," available at: <https://webdesigner.withgoogle.com/>. Accessed February 27, 2024.

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**D. Professor Gans' Market Share Figures Are Unreliable Measures of Monopoly Power and Overstate Google's Market Shares Because He Fails to Include Important Substitutes**

352) As I have explained, it is inappropriate to calculate market shares for separate components of Google's ad tech stack because Google operates these components as an integrated multi-sided platform. Nonetheless, I have conducted independent analysis to determine whether the display ads Professor Gans excludes from his narrow definition of display ads materially impact Google's market shares for his candidate markets for small advertiser buying tools and ad exchanges.<sup>539</sup> Based on my economic analysis and examination of the record, any properly defined ad tech market in this case should, at minimum, use the industry definition of display ads.<sup>540</sup> The only way Professor Gans can conclude Google has monopoly power is by assuming without proof a narrow definition of display ads that has the effect of excluding competition between Google and large platforms for buying and selling display ads (such as Meta and Amazon) and ignoring other factors that constrain Google (such as in-house solutions, direct deals, and substitution away from the open web by content viewers).

353) I find that Professor Gans' omission of relevant competition for display ads materially impacts his calculation of Google's market shares. Professor Gans' market share calculations overstate Google's market power because they exclude constraints that advertisers, publishers, or users could

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<sup>539</sup> I do not conduct parallel analysis for his candidate ad server market because it does not make economic sense to do so. As I have explained, direct evidence of low DFP prices is inconsistent with Google exercising monopoly power in his candidate ad server market, but consistent with such a market being contestable because of the threat that large publishers would build their own servers, or that competitors outside his narrow candidate market would reposition existing ad-serving technology to serve Professor Gans' narrow definition of display ads. See Section VII.C.2.c.

<sup>540</sup> As I have demonstrated, observed multi-homing patterns, cross-visitation patterns, survey results, and other data indicating substitution and constraints that Professor Gans ignores are consistent with the industry definition of display ads and inconsistent with Professor Gans' narrow definition of display ads.

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substitute towards if Google attempted to exercise monopoly power.<sup>541</sup> I conclude that Google's market shares are significantly lower by simply including the display ad and transaction types he excludes to conform to the eMarketer definition of display ads.<sup>542</sup>

***1. Google Ads and DV360 Combined Account for Less than [REDACTED] of U. S. Display Ad Spend Since 2013***

354) As I indicated above, Professor Gans has not demonstrated that there are separate relevant markets for buying tools for small advertisers and large advertisers. Accounting for competition that Professor Gans excludes based on his narrow definition of display ads significantly reduces the combined market share of Google Ads and DV360.<sup>543</sup>

355) When display ads are viewed consistent with eMarketer's use of the term, Google's combined (Google Ads and DV360) share of this candidate buying tool market has declined from a peak of about [REDACTED] in 2016 to about [REDACTED] in 2022.<sup>544</sup> I conclude that Professor Gans' high market

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<sup>541</sup> Regardless of whether one includes or excludes social media, mobile in-app, and video ads from the relevant antitrust market, it is appropriate to include ad tech providers of these ads in the relevant market for calculation of shares because they do constrain the exercise of monopoly power. This is consistent with statements by U.S. government antitrust enforcement agencies. "Firms that are not currently active in a relevant market, but that very likely would rapidly enter with direct competitive impact in the event of a small but significant change in competitive conditions, without incurring significant sunk costs, are also considered market participants." (U.S. Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at p. 49). See also U.S. Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, 2010, at pp. 15-16.

<sup>542</sup> Recall that eMarketer data indicates that display ad spending "includes advertising that appears on desktop and laptop computers as well as mobile phones, tablets, and other internet-connected devices for all formats mentioned; includes banners, rich media, sponsorships, video, and ads such as Facebook's News Feed Ads and Twitter's Promoted Tweets." (GOOG-AT-DOJ-DATA-000066787, at 'US Ad Spend Metrics' tab, cell Y67).

<sup>543</sup> The numerator, which I compute using Google Ads and DV360 ad spend, includes all ads purchased by advertisers using these tools except for Google search and audio ads, which is consistent with eMarketer's definition of display ads. Thus, the numerator includes ad spend on YouTube. The denominator is based on eMarketer data. Details are provided in Appendix VI.

<sup>544</sup> Figure 85 and Figure 86 show combined and individual shares of U.S. display ad spend for Google Ads and DV360.



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shares are sensitive to his narrow definition of display ads. However, as I have explained, I do not endorse the use of market shares on one component of Google's ad tech stack to infer monopoly power.

**2. *Google's Ad Exchange Has Accounted for Less than [REDACTED] of U. S. Display Ad Spend Since 2014***

356) Similarly, when display ads are viewed consistent with eMarketer's use of the term, Google's ad exchange share<sup>545</sup> has steadily declined from about [REDACTED] in 2014 to [REDACTED] in 2022.<sup>546</sup> I conclude that Professor Gans' high market shares are sensitive to his narrow definition of display ads. However, as I have explained, I do not endorse the use of market shares on one component of Google's ad tech stack to infer monopoly power.

**3. *Professor Gans' Market Share Figures Are Unreliable Measures of Monopoly Power Because they Ignore that Google Operates an Integrated Multi-Sided Platform***

357) As I have explained, Google's multi-sided platform is integrated across components of the ad tech stack and facilitates ad transactions between advertisers and publishers. Google competes against other integrated platforms as well as platforms that do not operate all components of the ad tech stack. It is my opinion that the correct framework for evaluating Google's market share is to define the relevant market around the transaction product—in this case, the matching of an impression on a publisher's ad space to an advertiser.

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<sup>545</sup> The numerator, which I compute using AdX, AdMob, and AdSense Backfill Data on the dollar value of impressions, includes all ads transacted except for audio. I note that Google search and Gmail are not in the AdX data. I also note that I include the ad revenue that YouTube earns in the numerator. The denominator is based on eMarketer data. AdX, AdMob, and AdSense amounts are adjusted upward to account for fees collected by buying tools. Details are provided in Appendix VI.

<sup>546</sup> See Figure 87 and Figure 88. I note that this market share is an upper bound for Google's market share in a candidate exchange market for display ads (using the eMarketer definition, which includes video, mobile in-app, and social media) because the numerator in each year assumes that every dollar Google earned on display ads was transacted through AdX. Google's share is significantly lower when ad spend on YouTube that is not transacted through AdX is excluded from the numerator. See Figure 89 and Figure 90.

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358) Professor Gans offers one definition of matched impressions: his narrow definition of display ads in the United States, which he uses to compute market shares in his three candidate markets for “tools.”<sup>547</sup> However, Professor Gans has not expressed any opinion as to whether Google possesses monopoly power in a market for matched impressions in which Google operates an integrated multi-sided transaction platform. Based on my examination of Professor Gans’ candidate relevant markets in Section VI.B, limiting impressions to Professor Gans’ narrow definition of display ads in the United States ignores competitive constraints imposed by display ads he excludes, including, at least: mobile in-app ads, video ads, social media ads, walled garden platforms, and direct deals.

359) Had Professor Gans used the appropriate framework and accounted for substitution among display ads as I have (or simply used eMarketer’s definition of display ads instead of his narrow definition), he would have found that Google’s share<sup>548</sup> in a relevant multi-sided market for display ad transactions in the United States has declined from over [REDACTED] in 2014 to about [REDACTED] in recent years.<sup>549</sup> In my opinion, these market shares more accurately reflect Google’s competition with Meta, Amazon, Microsoft, Twitter, Comcast NBCUniversal, TikTok, and a host of other display ad competitors.

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<sup>547</sup> As noted earlier, some of his calculations are not based on impressions. I also note that, when Professor Gans calculates market shares based on impressions, the impressions he uses do not correspond with impressions in his candidate markets. For example, his ad server market shares do not distinguish between his narrow definition of display ads and other ad formats, and his buying tool and ad exchange shares do so as well. I do recalculate his market shares for this discrepancy because he has not supported their exclusion with any data analysis.

<sup>548</sup> Both the numerator and denominator are based on eMarketer data. I discuss this in more detail in Appendix VI.

<sup>549</sup> See Figure 91.

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**E. The Rapid Evolution of Ad Tech Limits the Ability to Obtain or Exercise Monopoly Power**

360) In dynamic industries characterized by frequent entry, rapid expansion, and exit, firms face a perpetual need for investment to stay ahead of the curve.<sup>550</sup> The threat posed by emerging competitors, often not yet firmly established, compel incumbent firms to continuously innovate and invest to maintain their competitive edge.<sup>551</sup> In such industries, market shares may not fully reflect the intense competitive pressures faced by incumbents due to the fluid nature of the market. Beyond merely vying for market share with established competitors, firms in these environments face additional competitive pressure from the competitive threat of upstarts with low or no current market share.<sup>552</sup>

361) In the ad tech industry, Google has faced and does face significant competitive pressure from recent entrants and firms that have rapidly expanded. These emerging players compete for same advertisers, users and publishers and have offered new products and new solutions. The dynamic nature of this landscape has compelled Google to maintain a proactive stance, investing extensively in ad tech advancements to bolster its competitive standing. In this section, I document some of the competitive

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<sup>550</sup> “The central theme animating our analysis is that a market leader is best motivated to innovate if it fears losing its leadership position to a disruptive rival. Even a dominant incumbent will feel pressure to innovate if the bulk of tomorrow’s sales will be won by the firm that is most innovative, be that the incumbent or a disruptive challenger, and if other firms are in a position to leapfrog the current incumbent. Once one properly understands the dynamic nature of the competitive process, it becomes clear that greater rivalry—meaning greater contestability of tomorrow’s sales—leads to more innovation.” See Giulio Federico, Fiona Scott Morton and Carl Shapiro, “Antitrust and Innovation: Welcoming and Protecting Disruption,” in *Innovation Policy and the Economy*, Vol. 20, ed. Josh Lerner and Scott Stern, 2020, at p. 125.

<sup>551</sup> There is some heterogeneity on this point depending on the industry. But data suggest that incumbent firms in technologically advanced industries will innovate in response to potential new entrants. See Philippe Aghion, Richard Blundell, Rachel Griffith, Peter Howitt and Susanne Prantl, “The Effects of Entry on Incumbent Innovation and Productivity,” *The Review of Economics and Statistics*, Vol. 91, 2009, pp. 20-32.

<sup>552</sup> “Threat of technologically advanced entry encourages in-cumbent innovation and productivity growth in sectors that are initially close to the technological frontier.” See Philippe Aghion, Richard Blundell, Rachel Griffith, Peter Howitt, and Susanne Prantl, “The Effects of Entry on Incumbent Innovation and Productivity,” *The Review of Economics and Statistics*, Vol. 91, 2009, pp. 20-32, at p. 31.

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pressure that Google has faced from firms that have entered and rapidly expanded and how Google has invested in its ad tech in the face of this pressure.

362) First, multiple competitors have entered Professor Gans' candidate markets since the year 2000. Examples include Criteo, which was founded in 2005, has a platform called Commerce Max, and is a major competitor to Google;<sup>553</sup> AppNexus (now Microsoft's Xandr), which entered in the mid 2000s and competes in all three candidate markets;<sup>554</sup> Index Exchange, which released its ad exchange in 2011;<sup>555</sup> and Kevel, which entered the ad server market in 2010.<sup>556</sup> Additional competitors have entered in more recent years both into Professor Gans' candidate markets and in adjacent markets, including Amazon, which released three ad exchange products as well as a DSP service in the late 2010s.<sup>557</sup>

[REDACTED]

[REDACTED].<sup>558</sup>

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<sup>553</sup> Criteo, "We Are Criteo," available at: <https://careers.criteo.com/en/we-are-criteo/>. Accessed August 2, 2024; Criteo, "Commerce Max," available at: <https://www.criteo.com/platform/commerce-max/>. Accessed August 2, 2024.

<sup>554</sup> Crunchbase, "AppNexus," available at: <https://www.crunchbase.com/organization/appnexus>. Accessed August 2, 2024; Microsoft, "Microsoft Invest," available at: <https://about.ads.microsoft.com/en/solutions/technology/microsoft-invest-dsp>. Accessed July 16, 2024; Microsoft Advertising, "Microsoft Monetize," available at: <https://about.ads.microsoft.com/en/solutions/technology/microsoft-monetize>. Accessed July 16, 2024.

<sup>555</sup> Paleo Ad Tech, "34. Andrew Casale – from Casale Media to Index Exchange," available at: <https://paleoadtech.com/2023/12/10/34-andrew-casale-from-casale-media-to-index-exchange/>. Accessed August 2, 2024; AdExchanger, "Andrew Casale, Ad Tech scion, Takes Over (And Reboots) The Family Business," available at: <https://www.adexchanger.com/platforms/andrew-casale-ad-tech-scion-takes-over-and-reboots-the-family-business/>. Accessed August 2, 2024.

<sup>556</sup> Kevel, "Helping brands take back the Internet since 2010," available at: <https://www.kevel.com/about>. Accessed August 2, 2024.

<sup>557</sup> Amazon, "Introducing Amazon Publisher Cloud," available at: <https://aps.amazon.com/aps/index.html>. Accessed August 2, 2024; Amazon, "Amazon DSP," available at: <https://advertising.amazon.com/solutions/products/amazon-dsp>. Accessed April 26, 2024.

<sup>558</sup> [REDACTED]

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363) Google has responded to the competitive pressure from the entry of buyer tools, ad exchanges, and ad servers by innovating and investing in its ad tech stack. For example, as early as 2011, Google recognized that integrating its ad tech stack could be an effective way to compete: “[We] don’t want to sell it as all separate parts. Our competitors sell it as one item.”<sup>559</sup>

364) Beyond the entrance of competitors in buyer tools, ad exchanges, and ad servers, Google faces competition for publishers, advertisers, and users from outside of these candidate markets. The nature of digital advertising allows for participants inside and outside of each of Professor Gans’ candidate markets to reposition themselves as alleged market participants with relative ease as discussed in Section V. This repositioning can be achieved, for example, by developing a new tool using existing infrastructure such as OpenX, which launched an ad exchange after operating as an ad network.<sup>560</sup> Similarly, Epom launched an ad network in 2011 and a DSP in 2018.<sup>561</sup> Repositioning can also be achieved through updating existing products to better serve a broader audience as Stack did by pivoting its ad exchange to an open-source server.

365) Data also show that a large number of exchanges and demand-side platforms compete against Google’s ad tech. Data in addition show that between June 2018 and March 2023, the first and last months for which data about third-party exchanges are available in Google data, the number of competing third-party exchanges never falls below 40 when limited to Professor Gans’ narrow definition

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<sup>559</sup> GOOG-DOJ-06858337, at -459.

<sup>560</sup> OpenX, “OpenX Launches Groundbreaking Online Advertising Marketplace,” April 16, 2009, available at: <https://www.openx.com/press-releases/openx-launches-groundbreaking-online-advertising-marketplace/>. (OpenX announcing “integration of the ad server with OpenX Market” on April 16, 2009).

<sup>561</sup> Epom, “Brief History of Epom,” available at: <https://www.epom.com/about>. Accessed July 20, 2024.

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of display ads.<sup>562</sup> Data further show that the number of demand side platforms available to advertisers between June 2013 and March 2023 has hovered between 82 and 172 when limited to Professor Gans' narrow definition of display ads.<sup>563</sup>

**F. Examples of Substitution & Loss of New Sales**

366) These examples illustrate that customers have competitive options. They are consistent with my opinion that Google does not have the power to force existing customers to stay with its products when they desire to substitute away, nor does Google have power to force new potential customers to choose its ad tech products. These examples are not exhaustive and are meant to be illustrative of patterns that Google observes internally.

367) **Ad Servers:**

- a. In 2017, Axel Springer, parent company of such websites as Business Insider and Politico, switched from DFP to AppNexus (now Xandr).<sup>564</sup> AppNexus touted the ease of switching to its platform: "While digital publishers are frequently intimidated by the idea of changing their entire technology stack, our speedy implementation is proof that

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<sup>562</sup> See Exhibit 19.

<sup>563</sup> See Figure 92.

<sup>564</sup> AppNexus, "AppNexus + Axel Springer," available at: [https://www.appnexus.com/sites/default/files/case-studies/Axel-Springer-Case-Study\\_0.pdf](https://www.appnexus.com/sites/default/files/case-studies/Axel-Springer-Case-Study_0.pdf). Accessed August 4, 2024. Google documented that they have lost major accounts where publishers preferred AppNexus's features, pricing, or customer service over that which DFP offered, and actively examined ways to appeal to these publishers in the future. (GOOG-DOJ-02839847, at -853, -855). See GOOG-DOJ-04424050, at -051. ("Despite this weaker technological position, App[N]exus has had some important wins...").

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migrating ad servers isn't something to be afraid of - so long as you have the right technology partners at your side.”<sup>565</sup>

- b. In July 2022, Netflix announced that it will partner with Microsoft to provide the advertising technology for the streaming service's planned ad-supported tier. “Comcast's NBCUniversal subsidiary and Google were reportedly ‘top contenders’ to serve ads on Netflix before Microsoft won the contract.”<sup>566</sup>

368) **Exchanges:** On average, publishers connect to 3 different exchanges every month to sell narrow display ads.<sup>567</sup> This implies that for every impression they offer, 3 exchanges are receiving queries/callouts. Therefore, each individual auction potentially involves substitution when the winner of the auction-of-auctions changes.

369) **Buying Tools for Small Advertisers:** Google documents from 2016 indicate that 57 advertisers reduced ad spend or substituted away from Google Ads in favor of competitors, such as Criteo.<sup>568</sup> Since multi-homing is common on the buy-side, this substitution tends to reveal itself as budgets being reallocated among competitors, as opposed to fully dropping one buying platform for another. For example:

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<sup>565</sup> AppNexus, “AppNexus + Axel Springer,” available at: [https://www.appnexus.com/sites/default/files/case-studies/Axel-Springer-Case-Study\\_0.pdf](https://www.appnexus.com/sites/default/files/case-studies/Axel-Springer-Case-Study_0.pdf). Accessed August 4, 2024.

<sup>566</sup> Jon Brodtkin, “Microsoft wins deal to serve ads on Netflix, edging out Comcast and Google,” Ars Technica, July 13, 2022, available at: <https://arstechnica.com/information-technology/2022/07/microsoft-wins-deal-to-serve-ads-on-netflix-edging-out-comcast-and-google/>.

<sup>567</sup> See Figure 93.

<sup>568</sup> GOOG-TEX-00221417, at -440.

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- a. From the previous year, Expedia reduced its spend on Google Ads by [REDACTED] to “test[ ] for incrementality” on Criteo.<sup>569</sup>
- b. Light In The Box reduced Google Ads spend by [REDACTED], reallocating to Criteo thanks to a better ROI.<sup>570</sup>
- c. Conrad Electric spent [REDACTED] less on Google Ads in 2015, citing that they were “happy with Criteo performance, [and] decided to cut Google’s budget.”<sup>571</sup>
- d. Seven additional advertisers dropped Google Ads altogether, either to move to DV360 or third-party DSPs, including Lufthansa, Vistaprint, and Shop Direct.<sup>572</sup>

370) **Buying Tools for Large Advertisers:** Substitution can similarly be observed for advertisers using DV360 by reallocation of ad spend across different buy-side platforms. One Google document notes that “in 2020, Google has already lost [REDACTED] to [The Trade Desk], with another [REDACTED] at risk.”<sup>573</sup> Examples from a 2021 document include:

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<sup>569</sup> GOOG-TEX-00221417, at -440.

<sup>570</sup> GOOG-TEX-00221417, at -440.

<sup>571</sup> GOOG-TEX-00221417, at -440.

<sup>572</sup> GOOG-TEX-00221417, at -440.

<sup>573</sup> GOOG-AT-MDL-009703214, at -216. In internal documents, reasons discussed for losing revenue to The Trade Desk include advertisers’ desire to “leverage TTD’s CTV capabilities” and to break free from Google’s “targeting limitations (e.g. policies for Pharma and Gambling)”. See GOOG-AT-MDL-009703214, at -217.



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- a. GlaxoSmithKline and Bayer moved [REDACTED] in ad spend from DV360 to The Trade Desk thanks to those companies' "flexibility in advertising their pharmaceutical products."
- b. Mars moved [REDACTED] to The Trade Desk to "move away from reliance on [a] single DSP" with the added "perception of lower pricing."
- c. Ford moved [REDACTED] to The Trade Desk thanks to its abilities in "cross-device reporting and frequency capping for CTV."<sup>574</sup>

**VIII. ECONOMIC THEORY INDICATES THAT INTEGRATION BENEFITS CUSTOMERS**

371) Because the root of Plaintiffs' allegations centers around Google's decision to manage its ad tech (e.g., Google Ads, AdX, and DFP) as an integrated technology (allegedly to exploit links between DFP, AdX, and Google Ads in an anticompetitive fashion), it is important to account for the beneficial economic features of integration for advertisers, publishers, and users. Professor Gans does not do this. I have examined the relevant economic literature and the record and conclude that Professor Gans' analyses fail to recognize the benefits to advertisers, publishers, and users of integrating complementary components of the ad tech stack.<sup>575</sup> Consistent with economic theory, Google manages its ad tech stack as an integrated whole. Advertisers, publishers, and users broadly benefited from the more favorable

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<sup>574</sup> GOOG-DOJ-AT-01570215, at -219.

<sup>575</sup> Indeed, Google recognized that successfully integrating complementary elements of its ad tech stack would benefit customers and competition. *See, e.g.*, GOOG-TEX-00113101, at -118. ("[T]o lead the market, we need to deliver on a true integrated platform and monetization offering across all functions: product, sales, marketing, and services[.]").

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prices and quality that materialized as a result of Google's successful management of an integrated ad tech stack, thereby increasing the attractiveness of the components of its ad tech stack.

372) The first-order effects of integration are: more favorable prices, greater investments in technology, and higher quality. While some competitors might have lost business because they failed to replicate Google's value (in terms of both prices and quality), this does not amount to harm to the competitive process. Professor Gans repeatedly conflates Google's competitive success in the candidate markets with anticompetitive harm.

**A. Economics of Integration of Complementary Components**

373) Economists have long understood that integrating complementary elements of production or sales leads to downward pricing pressure and other benefits to customers.<sup>576</sup> These benefits stem largely from the internalization of pricing and externalities that arise when complementary products or different parts of the supply chain are managed holistically rather than independently. Further, the economic literature indicates that integration of complementary components or stages of production enhances incentives to make beneficial investments that might otherwise not occur.<sup>577</sup> These first-order procompetitive incentive effects are in addition to any efficiencies that arise from cost savings or holistically managing indirect network effects in a multi-sided market.

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<sup>576</sup> See, e.g., Augustin Cournot, *Researches into the Mathematical Principles of the Theory of Wealth*, MacMillan, 1897 at p. 99. See also Daniel O'Brien, "The Antitrust Treatment of Vertical Restraints: Beyond the Possibility Theorems," in *The Pros and Cons of Vertical Restraints*, ed. Swedish Competition Authority, 2008, at p. 40; Nicholas Economides and Steven C. Salop, "Competition and Integration Among Complements, and Network Market Structure," *The Journal of Industrial Economics*, Vol. 40, No. 1, 1992, at pp. 105-123 at p. 106.

<sup>577</sup> See Oliver E. Williamson, "The Vertical Integration of Production: Market Failure Considerations," *The American Economic Review*, Vol. 61, No. 2, 1971, at pp. 112-123; Paul L. Joskow, "Market Imperfections versus Regulatory Imperfections," *CESifo DICE Report*, Vol. 8, No. 3, 2010, at pp. 3-7; Michael D. Whinston, "On the Transaction Cost Determinants of Vertical Integration," *The Journal of Law, Economics, and Organization*, Vol. 19, No. 1, 2003, at pp. 1-23.

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374) In addition to these first-order procompetitive benefits (e.g., lower prices and higher quality),<sup>578</sup> economic theory indicates there may also be efficiencies stemming from cost savings due to cost complementarities and/or economies of scope.<sup>579</sup> These cost efficiencies are distinct from, and in addition to, benefits of scale economies alluded to in Plaintiffs' Complaint.<sup>580</sup>

375) As explained above, the economic literature teaches us that integration may be a procompetitive solution to solving externality problems and enhancing investment decisions. This is consistent with Professor Ghose's observation that Google's competitors "have introduced increasingly consolidated solutions that integrate different functions to improve aspects of the buying and selling process."<sup>581</sup>

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<sup>578</sup> See John Kwoka and Margaret Slade, "Second Thoughts on Double Marginalization," *Antitrust*, Vol. 34, No. 2, pp. 51-56, at p. 51 (noting that double marginalization is a situation where "an upstream monopoly faces a downstream monopoly in a fixed proportion production process. In this case, the unintegrated downstream firm 'over-prices' by marking up the already marked-up upstream product. By eliminating this double margin, or successive monopoly markups, vertical integration lowers prices and leads to benefits for both producers and consumers."). See also U.S. Department of Justice and The Federal Trade Commission, "Vertical Merger Guidelines," June 30, 2020, at p. 11 ("Vertical mergers combine complementary economic functions and eliminate contracting frictions, and therefore have the capacity to create a range of potentially cognizable efficiencies that benefit competition and consumers[...] ... Due to the elimination of double marginalization, mergers of vertically related firms will often result in the merged firm's incurring lower costs for the upstream input than the downstream firm would have paid absent the merger. ... The elimination of double marginalization ... arises directly from the alignment of economic incentives between the merging firms. Since the same source drives any incentive to foreclose or raise rivals' costs, the evidence needed to assess those competitive harms overlaps substantially with that needed to evaluate the procompetitive benefits likely to result from the elimination of double marginalization.").

<sup>579</sup> Serge Garcia, Michael Moreaux, and Arnaud Reynaud, "Measuring Economies of Vertical Integration in Network Industries: an Application to the Water Sector," *International Journal of Industrial Organization*, Vol. 25, No. 4, 2007, pp. 791-820, at p. 793 ("If an industry is characterized by several successive production stages, a single firm may be able to produce the complementary products of these different stages more efficiently than would several firms. Such industries present, at some stages, EVI, i.e. the total cost of producing is lower in a vertically integrated structure than in a disintegrated one.").

<sup>580</sup> See Fourth Amended Complaint, at ¶¶160, 515. Plaintiffs note that for an ad tech company, scale is "necessary to successfully compete with Google" and must be sufficient on both sides of the market "if [a competitor] hopes to become viable." See Gans Report, at ¶¶387, 377 (noting that "ad exchanges present economies of scale from the number of participants" and "it is difficult given Google's market power in adjacent markets for an entrant to gather enough buyers and sellers to obtain sufficient scale. For an individual exchange, indirect network effects emerge when the value buyers is increasing in the number and activity of sellers and vice versa.").

<sup>581</sup> Ghose Report, at ¶279.

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**B. Integration of Google's Ad Tech Stack Benefits Customers**

376) Professor Gans acknowledges that Google operates an integrated ad tech stack.<sup>582</sup> Google's interests are served by maximizing the collective value of this ecosystem for all actors—publishers, advertisers, and users. Google's revenue from providing its ad tech comes from taking a relatively constant share of the total value of the system.<sup>583</sup> Accordingly, Google can increase its revenues by increasing the size of the overall “pie”—that is, the value created by its ad tech. By integrating the ad tech stack, Google is able to account for externalities directly and more efficiently.

377) The documents I have reviewed suggest that Google's integrated structure allows it to address these externalities and prioritize health of the overall ecosystem over profitability of individual elements, even considering links across its ad tech stack when pricing and developing new features.<sup>584</sup> Google's business strategy—and one of its competitive insights—recognized that by managing its complementary ad tech stack in holistic fashion, it could create a win-win environment for customers (advertisers as well as publishers), itself, and users.<sup>585</sup> Google's customers and users in turn stood to

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<sup>582</sup> Gans Report, at ¶63. (“Google is vertically integrated across all relevant product markets that I define.”).

<sup>583</sup> Google's revenue share on the value its ad tech stack creates has remained relatively constant and is similar to revenue shares, commissions, and resale margins in other industries both today and historically. *See* Figure 94.

<sup>584</sup> *See, e.g.*, GOOG-DOJ-04004392, at -396. (“[I]ndependent profitability of [Google's] sellside platform is not a strict requirement though overall display profitability is clearly a requirement.”); GOOG-TEX-00656701, at -809. (“In a world where [Google] only cared about buy-side (e.g., if [Google] operated more like Criteo), [its] goal would be to maximize net revenue. However, Google operates in a complex ecosystem where [it] own[s] buy- and sell side products.”); GOOG-DOJ-09875130, at -132. (“Google “want[s] a sustainable video ecosystem for users, content partners, and advertisers.”); GOOG-DOJ-11770718, at 720. (“One of Google's “key pillars” is to “[b]uild and sustain a healthy ads ecosystem.”); GOOG-DOJ-04004392, at -396-397. (“propose that new inventory sources should be identified jointly across buy & sell side, and that [Google] should lead with a sellside network model...[Google's] sell-side pricing model is intertwined with [its] DBM business[.]”).

<sup>585</sup> A Google strategy presentation from 2006 emphasizes this on multiple facets of integration: “If our competitors offer full suite of ecommerce services and we offer only ads, our advertiser relationships will dwindle.” (GOOG-DOJ-01861309, at -317.) Further, Google recognized that they needed to “[r]elease Google Analytics [sic] v2.0 [to be] integrated with AdSense,” since “[a]dvertisers don't have tools to understand users and track ‘after the click’.” Moreover, Google recognized that a competitor integrating with DoubleClick or Atlas would give them “access to [redacted] of agency desktops [and] lock us out of branding.” (GOOG-DOJ-01861309, at -317, -319, -323).

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benefit from the first-order effects of more favorable prices and higher quality thanks to Google's incentives to account for externalities in its pricing and investment decisions.<sup>586</sup> Compared to a counterfactual world in which each component of the ad tech stack was under different ownership, requiring costly and imperfect contracting among parties to account for externalities, integration greatly reduces the cost of efficient coordination, which allows more and higher quality impressions to be served at lower prices than would prevail absent integration.

***1. Integrating the Ad Tech Stack Eliminates Double Marginalization***

378) Professor Gans ignores the voluminous economic literature that describes the impacts of integration and instead focuses entirely on a theory that “integration uniquely positions Google to leverage market power.”<sup>587</sup> Whether one views Google's ad tech stack as a multi-sided platform that facilitates transactions between advertisers and publishers to provide impressions to users, or as distinct multi-sided platforms or products that are related in the supply chain or through network effects, economic theory dictates that analysis of foreclosure properly accounts for the pricing incentives naturally resulting from integrating components of the ad tech stack.<sup>588</sup>

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<sup>586</sup> For example, in an internal strategy presentation, Google presents its mission as creating “a sustainable digital advertising industry” alongside the goals of “[h]elp[ing] media sellers of all types (publishers, broadcasters, online services, app developers) thrive and create sustainable businesses with advertising” and “[e]nsur[ing] that Google's media business has...low fraud rates and a great consumer experience.” (GOOG-TEX-00348289, at -297).

<sup>587</sup> Gans Report, at ¶63.

<sup>588</sup> Francine Lafontaine and Margaret Slade, “Vertical Integration and Firm Boundaries: The Evidence,” *Journal of Economic Literature*, Vol. 45, No. 3, 2007, pp. 629-685, at p. 680.

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379) One of the important benefits of managing a production process as an integrated<sup>589</sup> whole rather than as independent stages is that it eliminates double marginalization.<sup>590</sup> It is well-documented in both the theoretical<sup>591</sup> and empirical literatures<sup>592</sup> in economics that the elimination of double marginalization (“EDM”) results in lower prices and greater output. The benefits of lower prices and greater output arise because integrating the supply chain allows a business to internalize externalities across the ecosystem—to the benefit of itself and its customers.

380) Consider an unintegrated supply chain where an input is used to manufacture a product sold through a retailer. To maximize its profits, the input supplier will mark up the price of the input over its own costs. The input supplier thus ignores the negative externality arising because the higher input price increases the manufacturer’s costs and reduces its profits. Likewise, the manufacturer will mark up its wholesale price over its cost and ignore the negative externality arising because its extra markup reduces

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<sup>589</sup> The integration of stages of a production process is called vertical integration and entails the integration of complements (e.g., an upstream input and a downstream output). Horizontal integration refers to integrating substitutes (e.g., two competing products). As discussed earlier, vertical integration results in first-order downward pricing pressure. This is in contrast to horizontal integration, which results in first-order upward pricing pressure. *See, e.g.,* Daniel O’Brien, “The Antitrust Treatment of Vertical Restraints: Beyond the Possibility Theorems,” in *The Pros and Cons of Vertical Restraints*, ed. Swedish Competition Authority, 2008., at p. 40.

<sup>590</sup> Michael H. Riordan, “Competitive Effects of Vertical Integration” in *Handbook of Antitrust Economics*, ed. Paolo Buccirossi, 2008, at pp. 153-154.

<sup>591</sup> The seminal theoretical reference is Joseph J. Spengler, “Vertical Integration and Antitrust Policy,” *Journal of Political Economy*, Vol. 58, No. 4, 1950, pp. 347-352; *See also* Daniel O’Brien, “The Antitrust Treatment of Vertical Restraints: Beyond the Possibility Theorems,” in *The Pros and Cons of Vertical Restraints*, ed. Swedish Competition Authority, 2008, at pp. 40-101.

<sup>592</sup> *See, e.g.,* James C. Cooper, Luke M. Froeb, Dan O’Brien, and Michael G. Vita, “Vertical antitrust policy as a problem of inference,” *International Journal of Industrial Organization*, Vol. 23, No. 7-8, 2005, at pp. 639-664; Michael G. Vita, “Regulatory Restrictions on Vertical Integration and Control: the Competitive Impact of Gasoline Divorcement Policies,” *Journal of Regulatory Economics*, Vol. 18, 2000, at pp. 217-233; John M. Barron and John R. Umbeck, “The Effects of Different Contractual Arrangements: The Case of Retail Gasoline Markets,” *Journal of Law and Economics*, Vol. 27, 1984, at pp. 313-328; John Barron, Mark Lowenstein and John Umbeck, “Predatory Pricing: The Case Of the Retail Gasoline Market,” *Contemporary Policy Issues*, Vol. 3, 1985, at pp. 131-139; Andrea Shepard, “Contractual form, retail price, and asset characteristics in gasoline retailing,” *Rand Journal of Economics*, Vol. 24, No. 1, 1993, at pp. 58-77; Margaret E. Slade, “Beer and the tie: did divestiture of brewer-owned public houses lead to higher beer prices?” *Economic Journal*, Vol. 108, No. 448, 1998, at pp. 565-602; Tasneem Chipty, “Vertical integration, market foreclosure, and consumer welfare in the cable television industry,” *American Economic Review*, Vol. 91, No. 3, 2001, at pp. 428-453; and Kathryn Graddy, “Do fast-food chains price discriminate on the race and income characteristics of an area,” *Journal of Business and Economic Statistics*, Vol. 15, No. 4, 1997, at pp. 391-401.

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the input supplier's profits from reduced sales of the input. This is the double-markup problem: prices in the supply-chain ecosystem are higher than optimal for the supply chain because the input supplier and the manufacturer ignore the complementary nature of their respective products. Unfortunately, the externalities do not end here: in setting its price, the manufacturer also ignores the negative externality arising because its markup reduces the profits of the retailer selling the product to end-consumers. And the retailer, in marking up its retail price over costs to maximize its profits, ignores the negative externalities of its higher price on the profits of both the input supplier and the manufacturer. In this example, there is a triple marginalization. These extra margins hurt consumers because they lead to a higher retail price. A similar phenomenon would arise if Google Ads, AdX, and DFP were operated by three independent owners rather than a single, integrated platform.

381) Professor Gans fails to recognize that Google—as an integrated ad tech stack—has a strong economic incentive to internalize externalities across the ad tech stack.<sup>593</sup> For example, when setting its server fees, Google has an economic incentive to take into account the beneficial effects of lower ad server fees on its complementary components of its ad tech stack (e.g., its buying tools and exchange businesses), and vice versa.<sup>594</sup> These lower fees initiate a virtuous cycle that increases the overall size of the pie; by internalizing the externalities across the three elements of its ad tech stack, integration grows the collective value of the ecosystem for all actors—publishers, advertisers, and users. Google's revenue from providing its ad tech comes from taking a relatively modest share of the total value created by its

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<sup>593</sup> Documents are consistent with Google charging lower ad server fees to account for these sorts of externalities to grow the ecosystem. *See, e.g.*, GOOG-AT-MDL-B-000025178. (“[F]ree-standing margin/profit has never been a goal of this project [DFP] – our goals from PM/eng have been 1) grow platform volume 2) maintain top-line platform revenues 3) grow AdSense/AdX top-line revenues by facilitating backfill of AdSense and Ad Exchange into publishers’ unsold inventory.”).

<sup>594</sup> This incentive is in addition to its incentives as a multi-sided platform to charge lower prices.

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technology that efficiently matches advertisers with publisher impressions. Accordingly, Google can increase its own revenues by increasing the size of the overall “pie”—that is, the value its ad tech creates for all its customers.<sup>595</sup>

382) Expressed differently, by integrating its ad tech through common ownership, Google is also in a better position to internalize indirect network externalities directly and beneficially as compared to a situation where each tool of the stack is provided by different companies.<sup>596</sup> This is consistent with documents indicating that Google prioritizes the health of the overall ecosystem over the profitability of individual elements of its ad tech stack when making pricing and development decisions.<sup>597</sup>

383) Professor Gans divides web display tools offered by Google’s ad tech stack into four distinct markets (buying tools for large advertisers, buying tools for small advertisers, ad exchanges, and publisher ad servers) instead of considering it as an integrated multi-sided platform that serves advertisers, publishers, and users.<sup>598</sup> Economic theory predicts that, owing to EDM, the overall margin arising from Google managing these three elements of its ad tech stack cohesively rather than independently (whether by Google itself or distinct owners) will be lower. To illustrate, if Google (or three independent owners) operated its ad tech stack independently rather than cohesively, and at each

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<sup>595</sup> As discussed elsewhere in my report, economic theory indicates that increases in the value of the ad tech stack (e.g., the lower prices and higher quality resulting from Google’s investments in and management of an integrated ad tech stack) would make Google’s ad tech stack more attractive to advertisers and/or publishers using competitors’ stacks. For instance, in an internal strategy presentation, Google lays out that “[t]he DRX mission is to give publishers one platform for all screens that grows the programmatic pie by improving display ads for consumers, advertisers, and publishers.” (GOOG-DOJ-03725708, at -712).

<sup>596</sup> Economic theory indicates that integration of ownership is also likely to foster investments and better functional integration in features across the ad tech stack. I discuss these investments later in my report.

<sup>597</sup> See fn. 568.

<sup>598</sup> One can also work backwards and view an ad served in the ad server market as the input, and the final price paid by an advertiser at the buying tool stage as a markup over that price.



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stage earned the same [REDACTED] gross margin that the average manufacturer in the U.S. earns, the “margin” across the entire ad stack would be about [REDACTED].<sup>599</sup> Plaintiffs allege that Google’s fees in each of their candidate markets are “supracompetitive,”<sup>600</sup> but Google’s margin (what Plaintiffs call its “take rate” or “revenue share fee”)<sup>601</sup> in the candidate buying tools for small advertisers market is on the order of [REDACTED],<sup>602</sup> its fees in the candidate buying tools for large advertisers market are around [REDACTED],<sup>603</sup> its revenue share in the candidate market for ad exchanges is on the order of [REDACTED].<sup>604</sup>

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<sup>599</sup> The average gross margin of U.S. manufacturers is about 20 percent. (United States Census Bureau, “Annual Report for Wholesale Trade: 2021,” December 14, 2022, available at: <https://www.census.gov/data/tables/2021/econ/awts/annual-reports.html>). If an advertiser spent \$1 in one of the candidate buying tools markets, an independent ad buying tool would keep 20 cents, passing 80 cents to the ad exchange. The ad exchange would, in turn, keep 20 percent (or 16 cents), passing on 64 cents to the ad server. The ad server would keep 20 percent (13 cents), passing 51 cents on to the publisher.

<sup>600</sup> See Fourth Amended Complaint, at ¶¶506, 513, 524. Google’s overall margin across the ad tech stack is approximately [REDACTED], which is in line with the gross margin earned by the average manufacturer in the U.S. The average gross margin in the retail sector in the U.S. was also [REDACTED] in 2021. This means that the average retailer “takes” about [REDACTED] of the money they receive from consumers, and only sends the residual to manufacturers. This margin excludes retailers’ costs of operating, maintaining and promoting their retail establishments. Similarly, Google’s margin does not account for costs of developing and operating its ad tech stack. It also excludes numerous costs associated with promoting and maintaining the open web, including products like Google Maps, Chrome, Android devices, Gmail, Google Docs, and Google Drive. It also excludes Google’s investments in R&D. (See [REDACTED], “How our display buying platforms share revenue with publishers,” Google Ad Manager, June 23, 2020, available at: <https://blog.google/products/ads-commerce/display-buying-share-revenue-publishers/>. Accessed April 29, 2024; United States Census Bureau, “Annual Retail Trade Survey: 2021,” December 14, 2022, available at: <https://www.census.gov/data/tables/2021/econ/arts/annual-report.html>).

See Gans Report, at ¶812. (“AdX’s take rate has been higher than that of rival exchanges over time.”). See Gans Report, at ¶815. (“Google was able to charge supracompetitive prices on a per-query basis.”). See Gans Report, at ¶875. (“Google monetizes its market power through its fees or ‘take rate’ on AdX and Google Ads. It also charges a licensing fee for the use of its ad server, DFP. Google has the ability to vary its fee structure across markets but imposes the largest fee on AdX which applies to all AdX transactions. Google’s conduct forces all advertisers that desire DFP inventory to utilize AdX, and all publishers that want to access Google Ads demand must use AdX. Moreover, much of Google’s other conduct that I have described also causes an increased use of AdX. It makes sense that Google monetizes its monopoly power through its ad exchange.”).

<sup>601</sup> Fourth Amended Complaint, at ¶¶60, 118.

<sup>602</sup> I note that in the ordinary course, Google tracks a margin for combined, rather than separate, buying tool (Google Ads) and ad exchange transactions. For purposes of this illustration, I artificially separate the combined [REDACTED] margin into a [REDACTED] margin for Google Ads and a [REDACTED] margin for AdX. In fact, Google Ads does not charge a fixed impression fee or percentage of ad spend to advertisers who purchase clicks. These numbers are based on the estimated overall Google Ads margin in 2019, and “this is not a fixed per-impression fee. As Google Ads does not charge advertisers for most impressions, the amount it retains varies over time.” ([REDACTED], “How our display buying platforms share revenue with publishers,” Google Ad Manager, June 23, 2020, available at: <https://blog.google/products/ads-commerce/display-buying-share-revenue-publishers/>).

<sup>603</sup> See Exhibit 2.

<sup>604</sup> [REDACTED], “How our display buying platforms share revenue with publishers,” Google Ad Manager, June 23, 2020, available at: <https://blog.google/products/ads-commerce/display-buying-share-revenue-publishers/>.

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and the vast majority of Google's customers that use its ad server do not pay any fees to do so.<sup>605</sup> Across the ad tech stack, therefore, Google only retains about [REDACTED] of advertisers' dollars before remitting the rest to publishers, in contrast with the [REDACTED] margin that independent operators of each element of the ad tech stack may take in total.<sup>606</sup> This illustrates that integration results in downward pricing pressure and creates a larger "pie" because it eliminates double-marginalization.<sup>607</sup> These benefits are in addition to other procompetitive benefits that arise because an integrated firm can appropriately account for externalities across the supply chain, as I discuss next.

## ***2. Integrating the Ad Tech Stack Mitigates Free-Riding***

384) Another type of externality that arises in unintegrated supply chains is free-riding on demand-enhancing investments. Common examples include investments to improve quality or promotional expenses to grow demand for the final product. Free-rider problems exist in these scenarios because demand-enhancing investments at any stage of production benefit not only sales at that stage, but sales at other stages as well.<sup>608</sup> As with double marginalization, the problem stems from an

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<sup>605</sup> See Figure 45.

<sup>606</sup> [REDACTED], "How our display buying platforms share revenue with publishers," Google Ad Manager, June 23, 2020, available at: <https://blog.google/products/ads-commerce/display-buying-share-revenue-publishers/>.

<sup>607</sup> Even Google's competitors recognize the value of integrating buy and sell side products to improve customer experience and reduce prices paid. For example, The Trade Desk offers OpenPath, which is a direct-to-publisher offering that combines both the buy and the sell side together in an effort to eliminate double marginalization, "reduce data leakage and increase price transparency so publishers keep a greater share of ad revenue and advertisers see higher win rates." (See Anthony Vargas, "Is The Trade Desk Encroaching On SSP Turf With OpenPath?" AdExchanger, March 3, 2022, available at: <https://www.adexchanger.com/publishers/is-the-trade-desk-encroaching-on-ssp-turf-with-openpath/>).

<sup>608</sup> See Lester G. Telser, "Why Should Manufacturers Want Fair Trade?" *The Journal of Law and Economics*, Vol. 3, 1960, pp. 86-105; Michael Riordan and Steven Salop, "Evaluating Vertical Mergers: A Post-Chicago Approach," *Antitrust Law Journal*, Vol. 63, No. 2, 1995, at pp. 513-568; Ralph A. Winter, "Vertical Control and Price Versus Nonprice Competition," *Quarterly Journal of Economics*, Vol. 108, No. 1, 1993, at pp. 61-76; Francine Lafontaine and Margaret Slade, "Vertical Integration and Firm Boundaries: The Evidence," *Journal of Economic Literature*, Vol. 45, No. 3, 2007, at pp. 629-685; James C. Cooper, Luke M. Froeb, Dan O'Brien, and Michael G. Vita, "Vertical Antitrust Policy as a Problem of Inference," *International Journal of Industrial Organization*, Vol. 23, No. 7-8, 2005, at pp. 639-664.

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externality, where each firm's investment decision at one stage does not account for the benefits to other stages of production. Effectively, the entities at each stage have an incentive to free-ride on promotional investments by those managing other stages, resulting in underinvestment overall.<sup>609</sup> Similar to the manner in which integration grows an ecosystem through EDM and by internalizing network externalities, integration mitigates these free-rider problems. This results in greater investments.

385) For these reasons, economic theory indicates that Google has stronger incentives to make quality-enhancing and other investments to grow the ecosystem through its integrated ad tech stack than would be the case if it (or independent owners) operated components of the stack independently.<sup>610</sup> These

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<sup>609</sup> In an internal strategy document, Google notes a free-riding issue: "We offer a lot of flexibility in our AM product, which many publishers leverage to get a free product. [REDACTED] of our active AM publishers don't use AdX or AdSense. Most of these publishers are in the free tier of our AM product, meaning they get an entirely free product. When we think about our costs for computing resources, serviceability, sales, and product / eng[ineering] support, these publishers represent a significant tax on our business." (GOOG-DOJ-13218256, at -256).

<sup>610</sup> As discussed earlier, "independent pricing by producers of complements leads to higher prices and lower output than joint pricing. Although Cournot demonstrated this principle for environments in which the only strategic variable is price, subsequent work has shown that analogous results emerge when firms make independent investment decisions that enhance the value of the bundle. In such cases, firms invest less when they make investment decisions independently than when they do so jointly." (Daniel O'Brien, "The Antitrust Treatment of Vertical Restraints: Beyond the Possibility Theorems," in *The Pros and Cons of Vertical Restraints*, ed. Swedish Competition Authority, 2008, pp. 40-101, at p. 40).

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include investments not only in features of its ad tech tools that benefit advertisers,<sup>611</sup> publishers,<sup>612</sup> and users,<sup>613</sup> but investments to promote the Internet more generally.<sup>614</sup>

**3. Integrating the Ad Tech Stack Enhances Specific Investments**

386) Economic theory indicates that, in complex contracting environments, integration enhances specific investments by mitigating bargaining costs, problems of hold-up, and opportunism.<sup>615</sup>

387) Specific investments are those that make a commercial relationship more valuable.<sup>616</sup> Consider, for example, a factory that spends a considerable sum to develop a process or equipment

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<sup>611</sup> Google is constantly adding and improving the features it offers to advertisers. These include, among many others, “new features to help...grow demand with Discovery ads,” “testing new designs to improve how [Google Ads] is organized and make things easier to find...thanks to [advertiser] feedback,” “continued investments in AI-powered features,” and building “more durable and effective audience strategies.” (Google Ads Help, “New Features & Announcements,” available at: <https://support.google.com/google-ads/announcements/9048695>. Accessed August 3, 2023).

<sup>612</sup> Google recognizes that publishers are at risk of advertisers’ revenue being diverted away from quality publishers to counterfeit, misrepresented, and fake ad inventory. To address these issues, Google has “been investing in multiple initiatives to help alleviate these problems for our partners,” with the goal of “creating a fair and safe marketplace for publishers[.]” Google aims to “stop the sale and purchase of counterfeit inventory, and giv[e] publishers the controls to prevent unsuitable and unsafe ads from appearing next to their content.” (Google Ad Manager, “Improving Protections for Publishers,” available at: <https://admanager.google.com/home/resources/improving-protections-publishers/>. Accessed August 3, 2023).

<sup>613</sup> Because Google’s ad tech and search businesses both depend on users’ perceptions of the value and trust of the open web, Google has invested not only in products like Chrome, Gmail, Google Maps, and Android technology that benefit users, but also in privacy and online safety. In 2021, Google removed or restricted over 9.1 billion ads from being shown to users in order to protect potential victims of spam and fraud. “A trustworthy advertising experience is critical to getting helpful and useful information to people around the world...we’ll continue to...protect users and help credible advertisers and publishers.” (Scott Spencer, “Our 2021 Ads Safety Report,” available at: <https://blog.google/products/ads-commerce/ads-safety-report-2021/>. Accessed August 3, 2023). Further, “Google believes that... [it] can deliver privacy innovations that protect privacy for [its] users while enabling a robust ad supported ecosystem for [its] customers and partners to succeed.” (GOOG-AT-MDL-004299200, at -205).

<sup>614</sup> Google has created many non-ad tech products on the web that users value highly, such as Search, Chrome, Gmail, maps, Google Home devices, Google Sheets, Google Drive, etc. For example, a Google strategy presentation for 2017 states that “Google is predicated on ‘the open web’. We provide Search for it. We provide monetization tools for it,” with one conclusion being that Google should “[c]ontinue to invest in solutions for publisher monetization.” (GOOG-TEX-00124296 at -340-342). A Google strategy presentation for 2019 states that “Google operates in a complex ecosystem where we own buy- and sell side products and either one of those makes an important contribution to a sustainable open ecosystem.” (GOOG-DOJ-09712720 at -832).

<sup>615</sup> Paul L. Joskow, “Vertical Integration,” *The Antitrust Bulletin*, Vol. 55, No. 3, 2010, pp. 545-586; Michael D. Whinston, “On the Transaction Cost Determinants of Vertical Integration,” *The Journal of Law, Economics, and Organization*, Vol. 19, No. 1, 2003, pp. 1-23.

<sup>616</sup> See Michael R. Baye and Jeffrey Prince, *Managerial Economics and Business Strategy*, Edition 10, McGraw Hill, 2022, at pp. 183-185.

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designed to interface more efficiently with a specific, but independent, input supplier. Once a party makes a specific investment, however, it becomes susceptible to opportunism. In this example, the factory's specific investments in its interface with the specific supplier are lost when dealing with another supplier. The input supplier therefore has an economic incentive to behave opportunistically.<sup>617</sup> For example, it may attempt to engage in ex post bargaining to "holdup" the factory in an attempt to extract a higher input price.<sup>618</sup> Recognizing this risk, the factory may be reluctant to make beneficial relationship-specific investments in the first place, or otherwise skimp on such investments.<sup>619</sup> The same type of problem arises when the input supplier contemplates making a specific investment.

388) Underinvestment can result in less efficient production processes that can adversely impact prices and quality. The ad tech industry is complex. Consequently, crafting complete contracts that effectively incentivize optimal investment among actors in the supply chain can be extremely complicated and too costly to write.<sup>620</sup> Integration solves this problem; an integrated firm need not negotiate complex contracts to protect its investments, creating greater incentives for efficient investments that can improve quality and lower prices.

389) When transaction costs make market-based transactions expensive and risky, integration of the supply chain can be a better structure for achieving optimal outcomes in terms of interoperability,

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<sup>617</sup> See Michael R. Baye and Jeffrey Prince, *Managerial Economics and Business Strategy*, Edition 10, McGraw Hill, 2022, at p. 185.

<sup>618</sup> For example, when Google was developing Ad Connector to cater to publishers with in-house ad servers, records show that a publisher canceled their contract after encountering technical issues integrating the product with their system, while another "decided to go with a competitor a few months after signing a contract." (GOOG-DOJ-AT-02225544, at -544).

<sup>619</sup> See Michael R. Baye and Jeffrey Prince, *Managerial Economics and Business Strategy*, Edition 10, McGraw Hill, 2022, at pp. 184-185.

<sup>620</sup> See Michael R. Baye and Jeffrey Prince, *Managerial Economics and Business Strategy*, Edition 10, McGraw Hill, 2022, at pp. 191-192.

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quality, and price.<sup>621</sup> As one example, consider the specific investment of unifying the interface between a specific ad server and ad exchange. If the server and exchange are owned or operated independently, each party would have an economic incentive to skimp on the specific investments necessary to unify their interface. Integration helps solve these problems.<sup>622</sup>

390) Based on the relevant economics literature and my understanding of the industry, it is my opinion that Google's integration of its ad tech stack enhanced the specific investments required to improve quality and functionality of the tools used to convert advertiser demand into impressions served to content viewers visiting publisher websites.<sup>623</sup> Consistent with this opinion, the record indicates that Google's substantial investments in its integrated ad tech stack increased quality and functionality to the benefit of advertisers,<sup>624</sup> publishers,<sup>625</sup> and users.<sup>626</sup> Google's large and increasing investment in R&D for its display ad offerings is discussed further in the next section.

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<sup>621</sup> See Michael R. Baye and Jeffrey Prince, *Managerial Economics and Business Strategy*, Edition 10, McGraw Hill, 2022, at Figure 6-5.

<sup>622</sup> For a discussion of why contracts and other avenues are unlikely to be an effective remedy, see Paul L. Joskow, "Market Imperfections versus Regulatory Imperfections," *CESifo DICE Report*, Vol. 8, No. 3, 2010, pp. 3-7.

<sup>623</sup> Given the dynamic nature of the industry and the complexities of technology, it likely would have been challenging to efficiently solve the problems discussed above via contract, as this would have required complex contractual negotiations to determine technical specifications and division of profits the investment made possible, in addition to monitoring and enforcement.

<sup>624</sup> For example, integrating "Google and DoubleClick can deliver a more open platform for advertisers, and provide the metrics they need to manage marketing campaigns." Also, it benefited advertisers by consolidating reporting and allowing them to manage display ads on all properties and networks. (Alex Kinnier, "Why we're buying DoubleClick," available at: <https://googleblog.blogspot.com/2007/06/why-were-buying-doubleclick.html>. Accessed June 27, 2022).

<sup>625</sup> Revealed preferences of publishers indicate that Google's investments and integration improved quality and functionality. For example, results from a 2010 survey indicate that publishers' intent to renew DFP contracts was at a 6 year high, with 83 percent indicating that they were more than likely to renew, and 81 percent indicating that they recommend DFP to others. (GOOG-DOJ-09841308, at -327).

<sup>626</sup> Documents indicate that integration reduced ad server latency, which allows users to load web pages faster, to the benefit of both users and publishers. It also created a wider pool of publisher inventory for advertisers to access, meaning users received the benefit of more relevant ads and less spam and fraudulent ads. Google is also able to offer superior malware protections to limit users being bombarded with ads. See Alex Kinnier, "Why we're buying DoubleClick," available at: <https://googleblog.blogspot.com/2007/06/why-were-buying-doubleclick.html>. Accessed June 27, 2022; see also Abhilasha Sandilya, "Best Ad Servers For Publishers 2023," Headerbidding, February 21, 2024, available at: [https://headerbidding.co/best-ad-servers/#5\\_Best\\_Ad\\_Servers\\_For\\_Publishers](https://headerbidding.co/best-ad-servers/#5_Best_Ad_Servers_For_Publishers).

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**4. Documents and Data Are Consistent with Google's Integration Resulting in Greater Investments and Higher Quality**

391) Google's investments in an integrated ad tech stack began with the integration and launch of AdX 2.0.<sup>627</sup> But Google's investments and integration did not end with the launch of AdX 2.0, and continued over time.<sup>628</sup> In 2014, for example, integration was still ongoing, with an eye towards deeper integration by "merging" DFP and AdX into a single platform to further "improve the usability of our services and have a huge impact on streamlining the workflow of our customers."<sup>629</sup>

392) Consistent with economic theory, documents suggest that integration increased value for customers (that is, increased the size of the pie).<sup>630</sup> Documents also indicate that Google's decision to integrate its ad server and ad exchange (rebranded as GAM) was influenced by preferences expressed

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<sup>627</sup> See Internet archive, "DoubleClick Ad Exchange 2.0," available at: <https://web.archive.org/web/20091001044910/http://www.doubleclick.com:80/products/advertisingexchange/>. Accessed June 6, 2024.

<sup>628</sup> See Neal Mohan, "The next generation of ad serving for online publishers," Google Official Blog, February 22, 2010, available at: <https://googleblog.blogspot.com/2010/02/next-generation-of-ad-serving-for.html>; Payam Shodjai, "Getting Real with DoubleClick Bid Manager," DoubleClick Advertiser Blog, October 24, 2012, available at: <https://doubleclick-advertisers.googleblog.com/2012/10/getting-real-with-doubleclick-bid.html>. In an internal Google presentation from 2012 titled "Brand refresh: DoubleClick's Publisher Stack" Google states that its "Project Goal" is "[t]o revisit the structure and naming of DoubleClick's publisher offerings based on evolving market needs." (GOOG-TEX-00255353, at -353). Additionally, Google notes that "[a]s [Google] ramp[s] up [its] efforts to tell the full stack story across DFP and AdX, the right tweaks to [its] brand structure will enable [Google] to lean into that from a marketing perspective and pave the way for the two products' continued integration." (GOOG-TEX-00255353, at -355; GOOG-TEX-00048091, at -093. ("In July 2014, the DoubleClick for Publishers (DFP) and DoubleClick Ad Exchange ads products were merged to form a new product called DoubleClick Reservations & Exchange (DRX)."); Jonathan Bellack, "Exchange Bidding now available to all customers using DoubleClick for Publishers," Google Ad Manager, April 4, 2018, available at: <https://blog.google/products/admanager/exchange-bidding-now-available-to-a/>; Jonathan Bellack, "Introducing Google Ad Manager," Google Ad Manager, June 27, 2018, available at: <https://blog.google/products/admanager/introducing-google-ad-manager/>). As shown in Figure 95, Google has continued to increase its R&D spending while Plaintiffs allege Google was harming competition through allegedly anticompetitive business practices.

<sup>629</sup> GOOG-TEX-00082453, at -453.

<sup>630</sup> See, e.g., GOOG-TEX-00082536, at -537. (This document from November 2014 indicates "it is [Google's] duty to provide value (like reconciliation, optimization, etc) to [Google's] publishers."); GOOG-AT-MDL-B-002385448, at -448; GOOG-DOJ-03725708, at -712 (In an internal presentation from April 2016 titled "Results of Dr. Doom (DRX) and Q2 (AdMob) Product Prioritization," Google notes that "[t]he DRX mission is to give publishers one platform for all screens that grows the programmatic pie by improving display ads for consumers, advertisers, and publishers." Google also notes "[d]eliver[ing] compelling advertising experiences wherever users are accessing content" as part of this goal.); GOOG-TEX-00600302, at -305, -308 (In an internal strategy document from 2017, Google notes that "[it] should leverage the breadth of [its] technology stack and [its] scale across the open web to lead the industry in user-first, beautiful, ad experiences for modern devices via a specific investment in ad experiences." Additionally, Google notes that "[u]sers are at the center of everything [Google] do[es]. Building and maintaining relationships with users is critical to product and feature adoption - and ultimately Google revenue.").



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by its premium customers,<sup>631</sup> and that the fruits of Google's investments include streamlined interfaces<sup>632</sup> and a unified view for publishers with simplified yield optimization, reporting, and administration.<sup>633</sup> Documents also indicate that integration reduced Google's costs,<sup>634</sup> including the costs of interoperability.<sup>635</sup> Given that most of the paid impressions served by DFP were generated by DFP Premium publishers already using both AdX and DFP, Google saw an opportunity to unify the two products, which would result in a more efficient system for publishers.<sup>636</sup>

393) The observed increases in investments are consistent with the enhanced incentives to invest created by integration discussed above in Section VIII.B.3. This investment is likely a key factor behind Google's high-quality ad tech offerings, which make it a superior option for many advertisers and publishers. Thus, to the extent Google gained share at the expense of rivals following the launch of AdX 2.0 in 2009 and subsequent integration with the rest of its ad tech stack, these data are consistent with

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<sup>631</sup> Google conducted a survey of its publisher customers and explicitly asked: "Would you like DFP and AdX reporting to be unified in a single UI," with 75 percent of survey participants responded "Yes," and 78 percent responded that this type of integration would help in some way, including by "sav[ing] me time," "mak[ing] my life easier," "mak[ing] me more productive," and "reduc[ing] or eliminat[ing] discrepancy." (GOOG-AT-MDL-004176482, at "Form Responses 1" tab, cells G:G; AP:AP). *See also* GOOG-TEX-00255353, at -358 ("This study and its conclusions are based on numerous interviews over a six month period with stakeholders at all levels of Product, Sales, and Marketing. The study was also informed by informal discussions with publishers and buyers, and existing market research conducted by other groups at Google.").

<sup>632</sup> For example, one document indicates that Google recognized "an opportunity to streamline the workflow of [its] customers" and launched a new combined publisher platform team that would be "part of [its] overall effort to create a more streamlined product offering for publishers." (GOOG-TEX-00082453, at -454). Further, it would reduce the need for customers to "toggle between the two systems[.]" (GOOG-TEX-00082536, at -536).

<sup>633</sup> GOOG-TEX-00715568, at -568. ("DFP+Adx Unification ... Pros[:] Single yield optimization offering across video, mobile in-app, mobile web and desktop ... Simpler administration for managing unsold and programmatic"); GOOG-TEX-00156059, at -084 ("Numerous publisher benefits" including "Sav[ing] time," "Greater convenience," "Inreas[ing] productivity," "Eliminat[ing] discrepancy," and "All of the above.").

<sup>634</sup> By the time of the new DFP launch, the marginal cost for Google to serve an ad through DFP had declined from [REDACTED] to around [REDACTED]. (GOOG-TEX-00248625, at -625).

<sup>635</sup> GOOG-TEX-00082536, at -537, ("Ultimately given the users (publishers) of both AdX and DFP are the same there are engineering cost savings by having a single tech stack as opposed to two parallel ones").

<sup>636</sup> As explained in a Google document, "[t]he auction is the vessel that executes programmatic buys and DFP is the 'bank' of impressions. Combining the two will allow our publishers to move to a more efficient system." (GOOG-TEX-00082536, at -537).



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Google's gains stemming from procompetitive effects of its integration and concomitant investment decisions to create and continually improve superior products, not anticompetitive foreclosure. Professor Gans' analysis and Plaintiffs' foreclosure narrative fail to consider that Google's prominence may stem from the superior quality of its ad tech stack, not foreclosure.

394) Economic theory and industry sources indicate that ongoing investments in quality and innovation are necessary to stand out among the competition and succeed in the ad tech industry.<sup>637</sup> When Google attracts customers by providing a high-quality ad tech stack,<sup>638</sup> Google increases its share of sales through competition on the merits, rather than anticompetitive foreclosure. Professor Gans speculates that Google's growth stems from foreclosure and offers no analysis to refute the alternative that Google's success is driven by publisher and advertiser preferences.

395) Trade publications and other public sources frequently describe Google's offerings as among the top-ranking ad tech available.<sup>639</sup> AdX is considered a high-quality exchange for publishers,

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<sup>637</sup> One example of this is Yahoo, whose SSP exited the market in 2023 after failing to meet the quality standards set by other SSPs in the industry. "Publishers in Recurrent's portfolio complained that Yahoo's self-serve platform was less user-friendly than others. Leading SSPs have automated tools that allow publishers to customize a deal ID based on a buyer's needs in minutes" but for Yahoo, "the latency of getting those deals live was a challenge for supporting clients' demands." (Anthony Vargas, "Yahoo Shuttering its SSP is Evidence that Ad Exchanges are Becoming Interchangeable," AdExchanger, February 15, 2023, available at: <https://www.adexchanger.com/platforms/yahoo-shuttering-its-ssp-is-evidence-that-ad-exchanges-are-becoming-interchangeable/>).

<sup>638</sup> The quality of an ad tech stack may be evaluated through different dimensions depending on the perspective of the participants in the market. What makes an ad tech stack high-quality for publishers may be different from what makes it high-quality for advertisers, and similarly from internet users (e.g., relevant ads that do not interfere with content). Broadly, from an economic perspective, quality increases the value that a customer (or user) derives from the product, other things equal. The quality of ad tech may be increased by, e.g., mitigating risks for customers, reducing costs, or enhancing the return that customers receive.

<sup>639</sup> See, e.g., Brock Munro, "What is an Ad Exchange and How Does it Work?" Publift, April 15, 2024, available at: <https://www.publift.com/blog/what-is-an-ad-exchange>; CodeFuel, "Best Ad Exchanges for Publishers That Make Your Website Profits Soar," October 18, 2022, available at: <https://www.codefuel.com/blog/best-ad-exchanges-publishers/>; OKO, "Best Publisher Ad Servers on the Market," February 16, 2023, available at: <https://oko.uk/blog/best-publisher-ad-servers-on-the-market>; Brock Munro, "Best Ad Servers for Publishers in 2024," PubLift, June 28, 2024, available at: <https://www.publift.com/blog/best-ad-servers-for-publishers>; Aleesha Jacob, "Best Ad Server Platforms for 2024," MonetizeMore, April 2, 2024, available at: <https://www.monetizemore.com/blog/top-ad-servers-for-publishers/>; Max Freedman, "What Is Google Ads, and Why Should You Use It?" Business.com, March 14, 2023, available at: <https://www.business.com/articles/6-reasons-why-your-business-should-be-using-google-adwords/>.

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with efficient monetization,<sup>640</sup> advanced safety measures,<sup>641</sup> greater control,<sup>642</sup> and convenience.<sup>643</sup> Google's ad server is described as the "best ad server"<sup>644</sup> with an "intuitive interface and a wide range of features, including management tools, reporting and analytics, and a range of monetization options."<sup>645</sup> It is considered reliable, has strong privacy features,<sup>646</sup> and is praised for streamlined reporting and interoperability with AdX,<sup>647</sup> brand safety,<sup>648</sup> and security,<sup>649</sup> all of which are valuable to

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<sup>640</sup> Google's AdX is ranked as the number one ad exchange product by multiple online trade publications, with one calling AdX a "powerful tool" that allows "publishers to monetize their online content more efficiently" (Brock Munro, "What is an Ad Exchange and How Does it Work?" PubLift, April 15, 2024, available at: <https://www.publift.com/blog/what-is-an-ad-exchange/>).

<sup>641</sup> AdX has been described by others in the industry as the "world's best-performing ad exchange, ... providing access to ... some of the world's most advanced technology and safety measures" (CodeFuel, "Best Ad Exchanges For Publishers That Make Your Website Profits Soar," October 18, 2022, available at: <https://www.codefuel.com/blog/best-ad-exchanges-publishers/>).

<sup>642</sup> Another publication exclaims that AdX "trumps the competition in every regard by a long shot!", noting that it leads competitors with "[s]ome of the highest CPM in the industry[.]" and gives publishers "more control over how they sell their inventory[.]" (Uros Stanimirovic, "An In-Depth Guide to Top 10 Ad Exchanges for Publishers," TargetVideo, May 27, 2021, available at: <https://target-video.com/best-ad-exchanges/>).

<sup>643</sup> For example, one publication praises AdX for its "maximum" degree of convenience, with the platform "handl[ing] as many aspects of ad serving as possible (delivery, payment, currency conversion, etc.) to ensure [publishers] can focus on monetization instead of configuration." (CodeFuel, "Best Ad Exchanges For Publishers That Make Your Website Profits Soar," October 18, 2022, available at <https://www.codefuel.com/blog/best-ad-exchanges-publishers/>).

<sup>644</sup> In an online article titled "Best Ad Servers for 2024," the author describes Google Ad Manager as "[t]he first server on our list is one of the best and well known in the market. It hosts a long list of impressive features, is the preferred option for many premium publishers." (Aleesha Jacob, "Best Ad Servers for 2024," MonetizeMore, April 2, 2024, available at: <https://www.monetizemore.com/blog/top-ad-servers-for-publishers/>).

<sup>645</sup> One Hour Professor, "12+ Best Ad Server Software for Publishers and Networks," available at: <https://onehourprofessor.com/best-ad-server-software-for-publishers-and-networks/>. Accessed February 27, 2024. *See also* Aleesha Jacob, "What is Google Ad Manager – How to 10X Revenue With GAM?" MonetizeMore, November 28, 2022, available at: <https://www.monetizemore.com/blog/what-is-google-ad-manager-gam/>.

<sup>646</sup> GOOG-AT-MDL-004299200, at -207. ("[Google is] [l]eading the industry via a strong stance against tracking users across the web and a public proposal/vision to help the industry preserve the free and open web by investing in privacy alternatives" and its "[b]uilt in protections against micro-targeting."). Another internal strategy presentation from 2021 shows Google laying out its plans to "[i]nvest in Privacy Preserving Technologies" by "build[ing] foundations for solutions that will be sustainable for years, decades, even." Google sets its goal as "continu[ing] to raise the bar for user privacy by developing better, more privacy-focused experiences for users while addressing the requirements of publishers and advertisers." (GOOG-AT-MDL-004299200, at -211.)

<sup>647</sup> Internet Archive, "CodeFuel: Ad Server," available at: <https://web.archive.org/web/20231209080121/https://www.codefuel.com/glossary/ad-server/>. Accessed February 27, 2024.

<sup>648</sup> Google provides control to publishers in reviewing ad creatives through the Ads Review Center (ARC) dashboard. This ensures publishers have control over their brand safety and can take action to prevent future ads from appearing on their properties. (Google Ad Manager Help, "Ad review center overview," available at: <https://support.google.com/admanager/answer/146769>. Accessed July 29, 2024).

<sup>649</sup> Trade publications praise DFP's malware detection. (*See, e.g.*, Shubham Grover, "10 Best Ad Servers for Publishers in 2024: Power Up Your Profits," AdPushUp, February 20, 2024, available at: <https://www.adpushup.com/blog/best-ad-server-for-publishers/>).

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publishers when evaluating ad servers.<sup>650</sup> Google Ads and DV360 are considered top-ranking buying tools. Specifically, Google Ads is considered “[o]ne of the most powerful advertising tools ever created” through its high ROI, flexibility, transparency, wealth of high-quality inventory, customer support and education materials, and user-friendly interface,<sup>651</sup> as well as for providing a fuller set of features for the entire marketing funnel.<sup>652</sup> Likewise, DV360 is considered “one of the most advanced programmatic advertising platforms on the market today.”<sup>653</sup>

396) When a service provider exercises monopoly power, they offer a low-quality product at a high price, and there are typically many complaints. In contrast, when reviewers say the product is the highest quality and a good buy relative to competition, that corroborates competing on the merits, not the exercise of monopoly power. Evidently, Google’s buying tools provide advertisers access to the high-quality inventory, ROI, targeting, brand safety controls, and robust reporting that advertisers demand.<sup>654</sup>

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<sup>650</sup> Google has made note that “brand safety and controls” are features that publishers value as part of its guiding principles on publisher strategy. (GOOG-DOJ-04004392, at -396). And as one publication notes, “[d]isruptive ad behaviors lead to increased complaints, decreased engagement, and sky-high bounce rates. Those are all good reasons for visitors to stop coming back to [a] site—and for advertisers to stop buying [a publisher’s] ad space.” (Confiant, “Don’t let bad ads undermine your user experience,” available at: <https://www.confiant.com/solutions/quality>. Accessed July 25, 2024.) Therefore, publishers require the ability to “control the ads displayed on their websites” (HeaderBidding, “Ad Server – A Definitive Guide For Publishers,” available at <https://headerbidding.co/ad-server/>. Accessed August 4, 2024).

<sup>651</sup> See Max Freedman, “What Is Google Ads, and Why Should You Use It?,” Business.com, March 14, 2023, available at <https://www.business.com/articles/6-reasons-why-your-business-should-be-using-google-adwords/>; CodeFuel, “Best Advertising Platforms,” March 16, 2023, available at: <https://www.codefuel.com/blog/best-advertising-platforms/>.

<sup>652</sup> “While Criteo claims it is a full funnel solution, their technology is entirely limited to retargeting...[Also,] Criteo provides a limited set of dimensions and metrics for self-serve reporting, and won’t include important dimensions for data such as the domain where an ad appears, or audience segmentation and information.” (GOOG-TEX-00997803, at -806-807).

<sup>653</sup> Oleksandr Shykolovych, “What is DV360, and Why Opt For It Over Other DSP Platforms?” Improvado, December 9, 2023, available at <https://improvado.io/blog/what-is-dv360>. Google’s DV360 also consistently ranked highly in customer support contact and communication among various other DSPs in Advertiser Perceptions’ Demand Side Platforms Report from 1H 2021. (GOOG-DOJ-AT-02524665, at -701).

<sup>654</sup> GOOG-DOJ-AT-02524665, at -706 (“Determining drivers to consider and recommend DSPs”: “ROI/ROAS,” “Audience targeting capabilities,” “Reporting & insights criteria: ... Post ad campaign insights and recommendations”); Tiffany Caldwell, “Programmatic Advertising: Choosing the Right DSP for Your Business,” Portent, December 15, 2020, available at: <https://www.portent.com/blog/programmatic/programmatic-advertising-choosing-the-right-dsp-for-your-business.htm>.

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According to a 2021 Advertiser Perceptions survey, Google ranked highest on audience scale and reach, highest in “ease of onboarding & training,” and second only to Amazon’s DSP in the ROI/ROAS category.<sup>655</sup> Google also outperformed rivals in analytics capabilities, which was noted as a “top driver of [customer] acquisition.”<sup>656</sup> In areas where Google’s ad tech trailed the competition, Google documents indicate that it would be “addressing ‘weaknesses’ through innovations.”<sup>657</sup> Industry publications indicate that Google’s buying tools provide customers cost savings compared to rivals, as well as ease of integration with other Google marketing suite products, such as Google Analytics and Google Ads Data Hub.<sup>658</sup>

397) Google’s investments have also improved quality by mitigating externalities across the ecosystem. Exchanges that can prevent bad ads, including spam, malware, and ads for counterfeit products, are perceived to have higher quality.<sup>659</sup> Google’s integration of its ad tech stack following the launch of AdX 2.0 resulted in improved safety features and trust.<sup>660</sup> Google has sought to help publishers

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<sup>655</sup> GOOG-DOJ-AT-02524665, at -708, -715.

<sup>656</sup> GOOG-DOJ-AT-02524665, at -712.

<sup>657</sup> GOOG-TEX-00352384, at -386. Google documents also suggest vigorous quality-based competition among ad servers. For example, Google noted that AppNexus’ “overall technology [is] weaker than DRX [GAM], but some points of advantage (forecasting, openness, access to yield management)” and that “mak[ing] C-level engagement a priority – this is where AppNexus is strong.” (GOOG-DOJ-02839847, at -849, -855).

<sup>658</sup> Improvado, “What is DV360, and Why Opt For It Over Other DSP Platforms?” available at: <https://improvado.io/blog/what-is-dv360>. Accessed February 23, 2024 (“Google allows the integration of these two platforms with just a few clicks. The Trade Desk doesn’t offer native integration with Google Analytics, so you’ll have to search for workarounds to create audiences based on Google Analytics data.”).

<sup>659</sup> For instance, WebFX recommends that publishers consider brand safety and ensure that “[a]ny programmatic platform [they] use ... contain features for preventing fraud and protecting [their] brand,” including ad exchanges. (WebFX, “8 Top Programmatic Platforms and How to Choose One,” available at: <https://www.webfx.com/blog/marketing/top-programmatic-platforms/>. Accessed April 25, 2024). “Brand safety means avoiding placing ads next to inappropriate or malicious content and providing a safe environment for ad serving.” (HeaderBidding, “The Complete Guide to Brand Safety for Publishers,” available at: <https://headerbidding.co/brand-safety-publishers/>).

<sup>660</sup> Documents indicate that Google made concerted efforts to improve ad safety and trust in the years following the launch of AdX 2.0; the number of ads disapproved for policy violations more than doubled from 42.5 million in 2009 to 135 million in 2011. That same period saw advertiser account suspensions for policy violations increase twelve-fold from 68.5 thousand to 824 thousand. These efforts

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by investing its resources into a variety of features and solutions to help preserve the value of publishers' brands.<sup>661</sup> Google has also made investments to preserve the value that advertisers obtain from digital ads, including by absorbing risks from fraudulent ad inventory<sup>662</sup> and by developing methods to track spam traffic to ensure that publishing partners are offering advertisers high-quality impressions.<sup>663</sup> Google also began mandating Ads.txt pages for all of its publishers in 2018, which offered advertisers a way to verify authorized inventory and paved the way for greater industry adoption.<sup>664</sup> This IAB initiative involves public lists of authorized ad tech monetization partners through which publishers sell inventory,<sup>665</sup> which has the potential to raise awareness of—and foster competition between—Google's ad tech rivals by encouraging publishers throughout the industry to broadcast who they are working with. These investments are consistent with Google competing on the merits by increasing the quality of the ecosystem to attract customers.

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proved successful, as between 2010 and 2011, the proportion of ads violating Google's policies fell by over 50 percent. (David W. Baker, "The Fight Against Scam Ads—By the Numbers," Google, May 25, 2012, available at: <https://blog.google/technology/ads/fight-against-scam-ads-by-numbers/>); (Google, "Making Our Ads Better for Everyone," available at: <https://googleblog.blogspot.com/2012/03/making-our-ads-better-for-everyone.html>. Accessed August 5, 2023).

<sup>661</sup> As one spokesperson noted, "[s]ome of our publisher partners have asked us for help with understanding how their brand is impacted by counterfeit inventory and the scope of the issue across the ads ecosystem[.]" In response, Google invested in performing tests to identify the prevalence of "spoofing." (Michelle Castillo, "Online ad fraud is a 'widespread' problem, Google and other big ad platforms admit," CNBC, July 27, 2017, available at <https://www.cnbc.com/2017/07/21/google-oath-others-ad-fraud-widespread-problem.html>).

<sup>662</sup> Laura O'Reilly, "Google Issuing Refunds to Advertisers over Fake Traffic, Plans New Safeguard," The Wall Street Journal, August 25, 2017, available at: <https://www.wsj.com/articles/google-issuing-refunds-to-advertisers-over-fake-traffic-plans-new-safeguard-1503675395>.

<sup>663</sup> The median spam rate of Google's publishing partners has fallen from 17.04 percent in March 2019 to around 13.22 percent in February 2023. *See* Figure 96.

<sup>664</sup> Karl Moats, "The Rise of Ads.txt In Ad Tech," PubMatic, February 12, 2018, available at: <https://pubmatic.com/blog/ads-txt-rise-ad-tech/>.

<sup>665</sup> The IAB Tech Lab "[...] engages a member community globally to develop foundational technology and standards that enable growth and trust in the digital media ecosystem. Comprised of digital publishers, ad technology firms, agencies, marketers, and other member companies, IAB Tech Lab focuses on solutions for brand safety and ad fraud; identity, data, and consumer privacy; ad experiences and measurement; and programmatic effectiveness." (IAB Tech Lab, "About The IAB Tech Lab," available at: <https://iabtechlab.com/about-the-iab-tech-lab/>. Accessed May 22, 2024).

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398) Google's integration has also improved quality through beneficial indirect network effects. Data indicate that Google's investments improved quality by increasing the thickness of ad exchange auctions.<sup>666</sup> Economic theory indicates that having more advertisers translates into a better chance that a publisher's impressions receive bids, and having more participants results in higher CPMs.<sup>667</sup> Industry publications note that DSPs connecting to a higher number of SSPs and exchanges are typically better for advertisers,<sup>668</sup> and Google's data indicate that the number of SSPs and exchanges that DV360 has connected to has increased over the last decade.<sup>669</sup> Documents are also consistent with AdX customers valuing the thickness of activity on the platform.<sup>670</sup>

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<sup>666</sup> Thicker auction environments with more available inventory for willing buyers are likely to induce more and better matches, and therefore higher RPMs. Figure 97, [REDACTED] show that the number of publishers across Google [REDACTED] ad exchanges has been rising, [REDACTED]. Figure 100 and Figure 25 show that Google's buy-side tools for large and small advertisers, respectively, have attained a growing number of advertisers who purchase narrow display ads over time. As demonstrated in Figure 97, [REDACTED], since 2013, Google's exchange offers access to inventory from a larger number of publishers than [REDACTED].

<sup>667</sup> This is consistent with trade publications. According to Snigel, "more advertisers bidding for your ad space ... leads to higher CPMs and higher-quality ads for your site." (Snigel, "Top 10 Ad Exchanges," available at: <https://snigel.com/blog/top-ad-exchanges>. Accessed February 27, 2024).

<sup>668</sup> Sharethis, "How to Select the Best DSP for Your Needs," available at: <https://sharethis.com/data-topics/2022/11/find-the-best-dsp/>. Accessed August 3, 2024. ("[T]he number of exchanges and SSPs (Supply Side Platforms) that [a] DSP has access to will impact the number of people that can be reached[.]").

<sup>669</sup> In Section IX.C, I show an increasing number of ad exchanges to which U.S. advertisers submitted bids via DV360 from early 2019 to 2023.

<sup>670</sup> For example, see GOOG-TEX-00297007, at -010, where Google's internal view is that "volume in both # of buyers and sellers" are key drivers to the health of its ad exchange. Moreover, AdX is held in high regard on this dimension as giving publishers the ability "to reach a large number of high-quality advertisers ... which creates more competition, thus generating more revenue per ad impression" (See Ira Nikalaou, "Google Ad Exchange: What It Is and How to Join," Snigel, September 19, 2023, available at <https://snigel.com/blog/google-ad-exchange>). The data are consistent with Google's emphasis on attracting a large and growing volume of advertisers to its buying tools, which feed into its exchange. (See, e.g., Figure 100 showing the count of U.S. advertisers in the market of ad buying tools for large advertisers increasing from 2015 to 2023, regardless of whether the advertisers multi-home inside and outside the market, or just inside. On the other hand, Figure 25 shows the count of U.S. advertisers in the market of ad buying tools for small advertisers that only buy narrow display ads on that tool decreasing from 2015 to 2023.). On the other side of the equation, a high-quality exchange for advertisers would be one that offers a high volume of publishers with inventory to sell, creating a higher likelihood that some inventory will be a strong match for their ads (For instance, when discussing the different types of ad exchanges, PubLift lists "an extensive range of publisher ad inventory" as a benefit "to all the advertisers on the platform." (Brock Munro, "What is an Ad Exchange and How Does it Work?" PubLift, April 15, 2024, available at: <https://www.publift.com/blog/what-is-an-ad-exchange>)).

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399) In addition to the volume of advertisers placing bids, publishers generally prefer exchanges that will connect them to advertisers with a higher willingness to pay for their ad inventory. Higher willingness to pay can result in higher CPMs, and ultimately higher payouts received for the same ad space than if it were transacted elsewhere. The determinants of an advertiser's willingness to pay are not simply a matter of budget; they seek to place ads in front of users who are more likely to consume their goods or services and are willing to pay a premium to target such potential customers.<sup>671</sup> Google has a reputation for making such high-quality matches, as one publication states regarding AdX, "[t]here's more transparency between publishers and advertisers, which creates the opportunity for highly targeted ads. This benefits publishers because advertisers are often willing to pay more for highly targeted ads, and the user's experience tends to be more positive."<sup>672</sup> Additionally, revealed preference indicates that Google's ad tech is high quality; publishers and advertisers regularly run direct deals through AdX using its Programmatic Guaranteed feature, even though doing so requires advertisers using DV360 to pay a

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<sup>671</sup> This is described by Search Engine Journal in an article comparing ad networks for advertisers; "some advertisers are more likely to spend the big bucks to place their ads on sought-after sites." (Search Engine Journal, "The 17 Best Ad Networks For Content Creators In 2024," available at: <https://www.searchenginejournal.com/display-ad-networks/498862/>. Accessed April 26, 2024.).

<sup>672</sup> Ira Nikalaou, "Google Ad Exchange: What It Is and How to Join," Snigel, September 19, 2023, available at <https://snigel.com/blog/google-ad-exchange>.



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██████ fee<sup>673</sup> and publishers using GAM to pay a ██████ fee<sup>674</sup> that could be circumvented altogether.<sup>675</sup>

400) Data also indicate that Google's investments in a high-quality integrated ad tech stack are associated with demonstrably improved match quality, which benefits integrated users (who are exposed to fewer irrelevant ads), advertisers (who spend less on ads to disinterested consumers), and publishers (who allocate less digital space to ads that annoyed users visiting their sites). As shown in Exhibit 22, following integration of ad tech components and the launch of AdX 2.0 in September 2009, the click-through rate was about ██████.<sup>676</sup> This means that, on average, a user had to view almost ██████

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<sup>673</sup> Display & Video 360 Help, "Programmatic Guaranteed deals," available at: <https://support.google.com/displayvideo/answer/7067656>. Accessed April 22, 2024. ("To enable partners for Programmatic Guaranteed deals, you can either accept the ██████ and enable Marketplace from your partner account or contact your Display & Video 360 support representative.").

<sup>674</sup> The AdX Global Rate Card indicates a revenue share of ██████ for programmatic direct deals. (GOOG-DOJ-AT-00031508, at 'AdX Rate Card' tab, cells B8:D9). Because publishers may negotiate these terms, the overall average revenue share for programmatic guaranteed deals tends to be less than ██████. (See, e.g., GOOG-DOJ-05270444, at -453).

<sup>675</sup> Direct deals do not require an intermediary or an auction mechanism like indirect transactions. "Direct deal refers to a type of advertising transaction that occurs directly between a publisher and an advertiser, without the involvement of intermediaries like ad networks or programmatic ad exchanges. It is a direct, one-to-one advertising agreement between the two parties." (BidsCube, "Direct Deal," available at: <https://bidscube.com/blog/glossary/direct-deal/>. Accessed June 6, 2024).

<sup>676</sup> I use these data because they are the only data available before the integration of AdX and Google Ads through the launch of AdX 2.0. See Gans Report, at ¶420. ("In 2009, Google relaunched DoubleClick's exchange as AdX 2.0. As part of this revamp, Google made its ad-buying tool for small advertisers (AdWords) exclusive to its exchange, AdX."). These data do not allow one to disentangle AdX click-through rates from AdSense click-through rates after the launch of AdX 2.0 nor does it allow one to restrict the data to Professor Gans' narrow candidate market. Obviously, prior to AdX 2.0, these data are related to AdSense, rather than AdX. Figure 101 uses data that isolate Google Ads click-through rates through AdX alone and limited to Professor Gans' narrow candidate market. This figure also shows increasing quality (as measured by click-through rates) of matches.

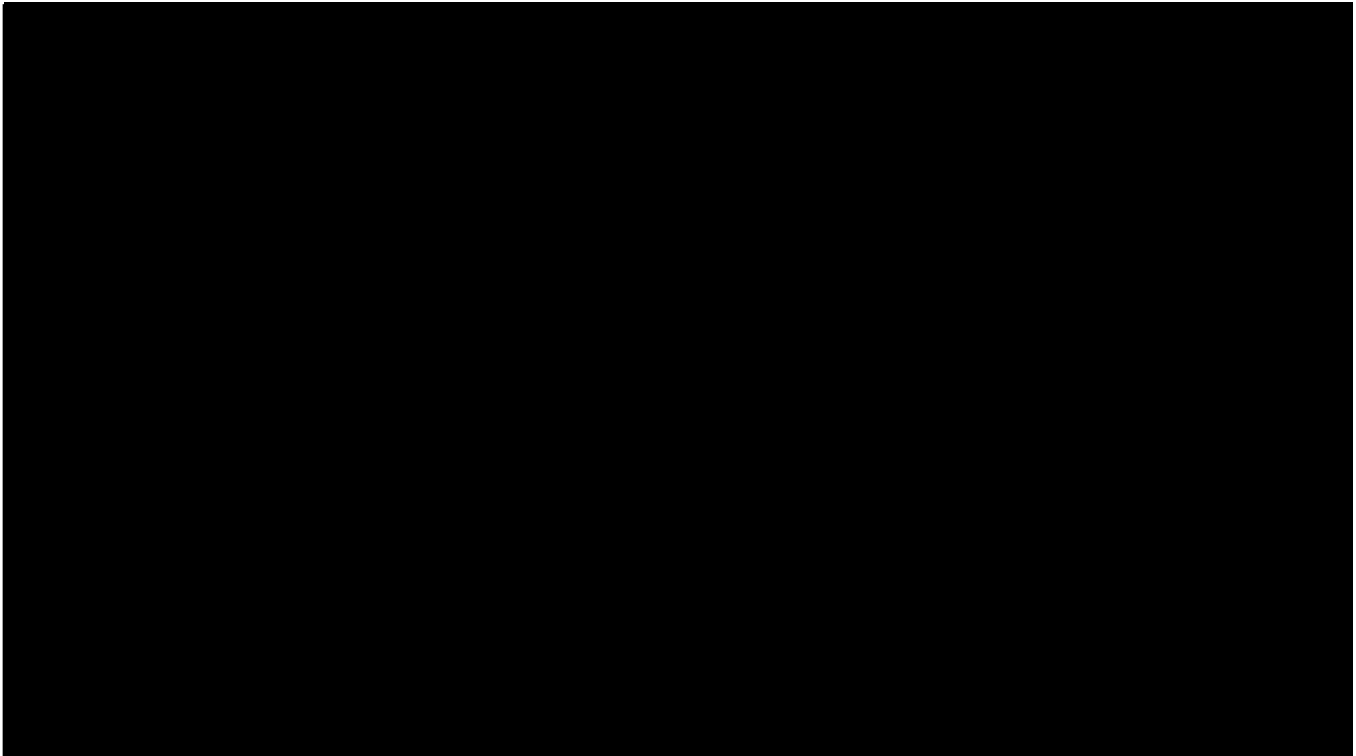
Figure 102 shows that the average click-through rate on Google Ads from purchases on AdX and third-party exchanges also increased steadily through 2022. Variation in the click-through rate for third-party exchanges in 2013 and early 2014 appears related to low volumes recorded in the data during this period of time. A click is a single instance of a user clicking on a display ad to be forwarded to a website specified by the advertiser that may sell its products or services, solicit donations, or provide more information on a topic. When an ad is clicked, it indicates that the user was interested enough in the ad to engage with it. Advertisers typically value clicks more highly than impressions, because they show more user interest and are more likely to generate sales or engagement. (NX3, "Impressions Vs. Clicks: What You Need the Most?" available at: <https://www.nx3corp.com/blog/impressions-vs-clicks/>. Accessed August 2, 2023). A click-through rate (or CTR) is a measure of the percentage of users who click an ad after being served an impression. It is the most common measure for how successful an ad has been at capturing a user's attention. It may be used as a proxy for the quality of an ad or for the quality of matches made by ad tech companies. (Adam Hayes, "Click-Through Rate (CTR): Definition, Formula, and Analysis," Investopedia, December 22, 2022, available at: <https://www.investopedia.com/terms/c/clickthroughrates.asp>).



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before observing one relevant enough to click. By May 2022, the click-through rate had increased to about [REDACTED]; this improvement in matching meant that users now only had to view around [REDACTED] before observing a click-worthy ad.<sup>677</sup> Data also indicate that a similar pattern holds for DV360: the click-through rate on DV360 has increased from less than [REDACTED] to [REDACTED] from 2015 to 2023.<sup>678</sup> Such increased quality is again consistent with enhanced investment incentives due to Google's integration.

**Exhibit 22**



Notes: Click-through rate is the number of clicks (total clicks) an ad receives divided by the number of times an ad is shown (total impressions).

Source: DOJ RFP 57 Autobidding Data.

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<sup>677</sup> See Figure 103.

<sup>678</sup> See Figure 104. Variation in the DV360 click-through rate in 2015 appears related to low volumes recorded in the data during this period of time.

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401) Professor Gans does not account for these and many other reasons advertisers and publishers might prefer Google’s ad tech to that of competitors. Publishers generally prefer a high fill rate (i.e., the ratio of ads served to ads requested) and can use this to monitor their ad server’s performance.<sup>679</sup> Ad servers that reduce technical issues like compatibility, latency,<sup>680</sup> and reporting discrepancies help ensure this rate remains high.<sup>681</sup> Across its ad tech stack—including in-app mediation which Professor Gans excludes from his candidate markets—Google has viewed the ability of publishers “to monetize their unfilled inventory, [and] achieve higher yield and/or better fill rates across various formats” as key to it “remain[ing] competitive[.]”<sup>682</sup> Likewise, high-quality inventory is key to advertisers’ choices, because ads on low-quality sites could have a “negative impact on ad performance and relationships with [their] customers.”<sup>683</sup> More generally, Google’s investments have benefited advertisers, publishers, and users

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<sup>679</sup> Aleesha Jacob, “How to Troubleshoot & Fix Unfilled Ad Impressions?” MonetizeMore, January 18, 2023, available at <https://www.monetizemore.com/blog/unfilled-ad-impressions-troubleshooting/>; Neeraja Shanker, “How do you optimize and increase your ad fill rate?” BlockThrough, April 5, 2022, available at <https://blockthrough.com/blog/ad-fill-rate/>.

<sup>680</sup> As one publication notes, “the longer it takes for a page to render in full ... the more likely it is that the user will leave the page prematurely [...] and consequently, fewer ad units load on the page, and fewer impressions are rendered.” (GeoEdge, “Why Monitoring Latency Is Key to Improving Publisher Revenue,” available at: <https://www.geoedge.com/demand-partner-latency-monitoring/>. Accessed April 25, 2024). Google also noted this issue, showing that an increase of 1000 ms of injected latency could reduce revenue by 3.5 percent. (GOOG-TEX-00348289, at -348).

<sup>681</sup> One trade publication notes that technical errors, compatibility, page latency, and reporting discrepancies, are four of the six major reasons fill rates fall below 100%, along with a lack of demand, and use of adblockers. (See Neeraja Shanker, “How do you optimize and increase your ad fill rate?” BlockThrough, April 5, 2022, available at: <https://blockthrough.com/blog/ad-fill-rate/>).

<sup>682</sup> GOOG-TEX-00118400, at -435.

<sup>683</sup> Marketron, “What’s the Real Quality of Your DSP Inventory?” June 21, 2023, available at: <https://www.marketron.com/media-mentions/2023/06/21/quality-of-dsp-inventor>.

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by “continually implementing new ad formats and features, further empowering advertisers to reach new audiences and drive new business,”<sup>684</sup> and improving the experiences and trust of users.<sup>685</sup>

**IX. DATA AND THE RECORD ARE INCONSISTENT WITH ANTICOMPETITIVE FORECLOSURE AND CONSISTENT WITH COMPETITIVE OUTCOMES**

402) Plaintiffs allege that, beginning with the acquisition of DoubleClick in 2008, Google created an integrated ad tech stack—and adopted business practices that capitalize on links in that stack—that foreclosed competition in their narrow candidate markets.<sup>686</sup> Professor Gans asserts that the integration and evolution of Google’s ad tech stack between 2008 and the present has harmed competition by foreclosing rivals. Professor Gans’ analysis is not tethered to the economic literature on vertical integration or multi-sided markets. His analysis wrongly equates business practices that allowed Google to attract customers through quality competition with actual and attempted harm to competition and foreclosure of rivals. Despite the voluminous data available in this case, Professor Gans does not demonstrate that Google’s business practices adversely affected market output, prices, or quality.

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<sup>684</sup> WordStream, “Facebook Ads vs. Google Ads: Which Should You Be Using?” available at: <https://www.wordstream.com/facebook-vs-google#:~:text=1.,web%20searches%20every%20single%20year>. Accessed February 23, 2024.

<sup>685</sup> From 2007 to 2013, the share of users who trusted online banner ads rose from 26 percent to 42 percent. (See Yuyu Chen, “Nielsen Study: Trust in Online Advertising Increasing,” ClickZ, September 18, 2013, available at: <https://web.archive.org/web/20160923035901/https://www.clickz.com/nielsen-study-trust-in-online-advertising-increasing/36268/>). In 2024, 78 percent of internet users “would prefer to get additional ads in turn for having to pay nothing” to access websites and apps, indicating that the current digital ad environment brings internet users a high-quality ads experience that they value. (See Interactive Advertising Bureau, “The Free and Open Ad-Supported Internet: Consumers, Content, and Assessing the Data Value Exchange,” available at: <https://www.iab.com/wp-content/uploads/2024/01/IAB-Consumer-Privacy-Report-January-2024.pdf>. Accessed April 10, 2024).

<sup>686</sup> See Fourth Amended Complaint, at ¶19 (“The origins of Google’s display advertising monopolies trace back to its 2008 acquisition of DoubleClick, which operated the leading ad server, DFP. Google’s new position as the middleman between publishers and exchanges was a key step in its unlawful strategy to monopolize the market for ad servers. It did so by effectively turning DFP—previously a clearinghouse of impression inventory that relied on price competition—into a chokepoint through which it could exclusively control access to the must-have demand of hundreds of thousands of advertisers. . . .Google accomplished this by coercively tying its DFP ad server to its AdX exchange—the only exchange where publishers could access bids from advertisers that used Google’s monopoly ad buying tool.”); Gans Report, at ¶12 (“Starting in 2008 with Google’s acquisition of DoubleClick, Google began acquiring other ad tech companies and products involved in every aspect of the ad tech stack. Using its control of those products, Google then engaged in a number of different types of conduct—tying of its products, product restrictions, and auction manipulations that resulted in monopoly power in several related but distinct markets. This monopoly power harmed competition in these markets and injured consumers.”).

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Additionally, while Professor Gans asserts that many of Google's business practices harmed rivals and deprived them of business, his report lacks data demonstrating that the number and scale of rival ad tech firms shrunk as a result of Google's business practices or that any reduction in business deprived rivals of sufficient scale to compete effectively.

**A. Economics of Foreclosure**

403) To analyze Professor Gans' claims properly, first, it is important to distinguish a valid theory of anticompetitive foreclosure from the "naïve foreclosure analysis"<sup>687</sup> conducted by Professor Gans. *Naïve* foreclosure analysis focuses myopically on whether a firm's business decisions impact rivals' access to an input or customers.<sup>688</sup> Naïve foreclosure analysis is incomplete and can lead to erroneous conclusions because it confuses harm to competitors with harm to competition. For example, a firm may attract customers through improved quality of its products, which may result in the reduction of the scale of a rival's business. More generally, procompetitive business practices and intense competition that benefit customers often harm competitors. Professor Gans does not provide an underlying economic framework from which one can evaluate whether a competitor's exit or failure to grow arises as a consequence of competition on the merits or as a casualty of anticompetitive behavior.

404) *Anticompetitive* foreclosure occurs when a firm alters rivals' access to an input involved in the production or sale of a product, or their ability to reach customers for that product, and the result of this deprivation is less competition and concomitant harm to customers in a relevant market—that is,

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<sup>687</sup> See, e.g., Joshua D. Wright, "Moving Beyond Naïve Foreclosure Analysis," *George Mason Law Review*, Vol. 19, No. 5, 2012, pp. 1163-1198.

<sup>688</sup> "[T]he measure of foreclosure from the perspective of these discredited [naïve] foreclosure theories is merely the fraction of input supply (or customers) foreclosed" (Joshua D. Wright, "Moving Beyond Naïve Foreclosure Analysis," *George Mason Law Review*, Vol. 19, No. 5, 2012, p. 1167.)

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anticompetitive foreclosure reduces output (or, equivalently, raises prices or reduces quality).<sup>689</sup> For example, this may occur if a vertically integrated firm reduces market output and raises market prices by preventing rivals from accessing inputs.<sup>690</sup> Similarly, a manufacturer might use exclusive contracts, bundling, or tying to increase its rivals' costs to access downstream distribution. Again, this type of foreclosure is anticompetitive if the end result is reduced output, higher prices, or lower quality because rivals are providing less competitive pressure.<sup>691</sup>

405) Input foreclosure refers to a scenario where a firm (the "input supplier") has monopoly power over an important input and either (i) refuses to provide the input to rivals who use the input to sell a competing product or (ii) increases rivals' costs of using the input.<sup>692</sup> Input foreclosure is anticompetitive if it reduces market output (or raises the prices or reduces the quality) of the product *produced* with the input.

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<sup>689</sup> The modern economic theory of foreclosure is generally referred to as one of "Raising Rivals' Costs." See Steven Salop and David Scheffman, "Raising Rivals' Costs," *American Economic Review*, Vol. 73, No. 2, pp. 267-271; see also Thomas Krattenmaker and Steven Salop, "Anticompetitive Exclusion: Raising Rivals' Costs To Achieve Power over Price," *Yale Law Journal*, Vol. 96, No. 2, 1986, pp. 209-294. Costs can be increased to rivals in a variety of ways. In the vertical integration context, for example, the upstream division of an integrated firm may degrade the terms of access for an input to non-integrated downstream rivals. Similarly, a manufacturer may sign distributors to exclusive contracts, which deny rival manufactures access to distribution channels and perhaps efficiencies from scale economies.

<sup>690</sup> See Carl Shapiro, "Vertical Mergers and Input Foreclosure Lessons from the AT&T/Time Warner Case," *Review of Industrial Organization*, Vol. 59, No. 2, 2021, pp. 303-341.

<sup>691</sup> See Ilya Segal and Michael Whinston, "Naked Exclusion: Comment," *American Economic Review*, Vol. 90, No. 1, 2000, pp. 296-309 (models examining these types of theories); see also Michael Whinston, "Tying, Foreclosure, and Exclusion," *American Economic Review*, Vol. 80, No. 4, 1990, pp. 837-859.

<sup>692</sup> If the "dominant or monopolistic firm supplies an important manufacturing input [... and the] supplier could insulate a significant part, or even the entirety, of the upstream market by limiting rivals' access [after an acquisition ... this is] known as 'input foreclosure[.]'" (Concurrences, "Foreclosure," available at: <https://www.concurrences.com/en/dictionary/foreclosure-117887>. Accessed August 5, 2024.) I note that when inputs are used in fixed proportions, the well-known "one monopoly rent theorem" indicates that input foreclosure is neither profitable nor harms customers even if the input supplier is a monopolist. (See Ward S. Bowman, "Tying Arrangements and the Leverage Problem," *The Yale Law Journal*, Vol. 67, No. 19, 1957, pp. 19-26; Robert Bork, *The Antitrust Paradox*, Basic Books, 1978, at pp. 372-375; Dennis Carlton and Michael Waldman, "Robert Bork's Contributions to Antitrust Perspectives on Tying Behavior," *The Journal of Law and Economics*, Vol. 57, No. S3, 2014, pp. 121-144, at pp. S122-S123).

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406) Customer foreclosure involves restricting rivals' ability to sell to some or all of a firm's customers.<sup>693</sup> Under this scenario, rivals are prevented from competing for those customers. Customer foreclosure is anticompetitive if its effect on competition is to reduce market output (or raise the prices or reduce the quality) of the product.

407) Even if Google had deprived rivals of scale (as Professor Gans asserts but which is inconsistent with data discussed in Section IX.C), it does not follow that prices would have been lower (or quality higher) in a but-for world where other firms served Google's customers; sustainable prices may be higher when customers are spread across many firms. Moreover, to the extent that rivals were deprived of scale because customers viewed Google's ad tech stack as superior (e.g., because of its higher quality, better features and/or lower prices),<sup>694</sup> this would not amount to anticompetitive foreclosure.

**B. Documents and Data Reflect Benefits to Publishers, Advertisers, and Users Throughout the Time Period Plaintiffs Allege Harm to Competition**

408) As discussed above, the economic literature indicates that integrating the ad tech stack is likely to result in procompetitive benefits to customers.<sup>695</sup> If externalities motivated Google to act in the

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<sup>693</sup> See, e.g., Jonathan Baker, Nancy Rose, Steven Salop, and Fiona Scott Morton, "Five Principles for Vertical Merger Enforcement Policy," *Antitrust*, Vol. 33, 2019, pp. 12-19, at p. 16.

Economic literature describes several factors that affect the feasibility of implementing anticompetitive customer foreclosure. For example, a firm has to be able to prevent its customers from turning to other downstream rivals that they would turn to absent the business practice. It is not foreclosure if customers choose to exclusively consume a firm's product because the firm charges favorable prices or offers a superior product. (See Francine Lafontaine and Margaret Slade, "Exclusive Contracts and Vertical Restraints: Empirical Evidence and Public Policy" in *Handbook of Antitrust Economics*, ed. Paolo Buccirossi, 2008, at pp. 396-397).

<sup>694</sup> As I discuss later, documents and data indicate that any scale advantages Google might have enjoyed over rivals likely stem from its investments in a high-quality, integrated, ad tech stack rather than the allegedly anticompetitive business practices.

<sup>695</sup> See Francine Lafontaine and Margaret Slade, "Vertical Integration and Firm Boundaries: The Evidence," *Journal of Economic Literature*, Vol. 45, No. 3, 2007, pp. 629-685; James C. Cooper, Luke M. Froeb, Dan O'Brien, Michael G. Vita, "Vertical Antitrust

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interest of the open web ecosystem and deeper integration of Google's ad tech stack were procompetitive, economic theory predicts that Google's R&D investments and the quality of its services would increase, total industry output would increase, and customers would have enjoyed more favorable prices over the past 15 years.<sup>696</sup> On the other hand, if Google's management of an integrated ad tech stack—including the allegedly anticompetitive business practices discussed by Professor Gans and in the Plaintiffs' Complaint—harmed competition, one would expect quality to be lower, industry output to be lower, and prices to be higher<sup>697</sup> than would prevail absent the anticompetitive conduct. This is not what I find. To the contrary, the data and documents are consistent with advertisers, publishers, and users

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Policy as a Problem of Inference," *International Journal of Industrial Organization*, Vol. 23, Issues 7–8, 2005, pp. 639-664; Francine Lafontaine and Margaret Slade, "Presumptions in Vertical Mergers: The Role of Evidence," *Review of Industrial Organization*, Vol. 59, Issue 2, No. 7, 2021, pp. 255-272; Paul L. Joskow, "Market Imperfections versus Regulatory Imperfections," *CESifo DICE Report*, Vol. 8, No. 3, 2010, pp. 3-7; Michael D. Whinston, "On the Transaction Cost Determinants of Vertical Integration," *The Journal of Law, Economics, and Organization*, Vol. 19, No. 1, 2003, pp. 1-23. In specialized circumstances it is theoretically possible that these first order benefits from integrating complementary elements of the ad tech stack might be offset by horizontal or strategic effects that have the potential to reduce output, raise prices, or reduce quality. For example, the authors of one recent paper suggest that it is *possible* that "platform annexation" (e.g., integration into the server side of the supply chain) might harm competition. Their analysis considers this possibility but does so in isolation—after acknowledging that "A supply chain characterized by double marginalization and underinvestment will be inefficient and produce a product that is less attractive to consumers. Vertical integration is one tool that can resolve the conflicts of interest in the supply chain if it gathers all the parties that are part of the effort to [combine the products] into one balance sheet and decision-making entity; though, again, whether this can be done is an empirical question." (Susan Athey and Fiona Scott Morton, "Platform Annexation," SIEPR Stanford Institute for Economic Policy Research, Working Paper, 2021, at p. 8, available at: <https://siepr.stanford.edu/publications/working-paper/platform-annexation>.) Importantly, much of this theoretical literature completely ignores the procompetitive benefits described above by assuming they are zero, and then show that competitive effects are ambiguous (e.g., that anticompetitive effects are a theoretical possibility). For a discussion of so-called "possibility theorems," see, e.g., Michael Riordan and Steven Salop, "Evaluating Vertical Mergers: A Post-Chicago Approach," *Antitrust Law Journal*, Vol. 63, No. 2, 1995, pp. 513-568; Daniel O'Brien, "The Antitrust Treatment of Vertical Restraints: Beyond the Possibility Theorems," in *The Pros and Cons of Vertical Restraints*, ed. Swedish Competition Authority, 2008., at p. 40.

<sup>696</sup> Vertical integration can internalize various externalities, as explained in section VIII.B, including by eliminating double margins and by motivating vertically integrating firms to invest more in quality and service. "Vertical integration can eliminate successive monopoly markups, internalize service and quality externalities, and reduce transactions costs," ultimately benefitting the ecosystem as a whole. (Tasneem Chipty, "Vertical integration, market foreclosure, and consumer welfare in the cable television industry," *American Economic Review*, Vol. 91, No. 3, 2001, pp. 428-453, at p. 428.)

<sup>697</sup> As noted earlier, integration may increase investments and therefore improve the quality and features of products or services. To the extent that integration results in higher quality products, which sell at higher prices than lower quality products, merely observing higher prices following integration does not imply integration resulted in anticompetitive price increases. See Christopher Hansman, Jonas Hjort, Gianmarco Leon-Ciliotta, and Matthieu Teachout, "Vertical integration, supplier behavior, and quality upgrading among exporters," *Journal of Political Economy*, Vol. 128, No. 9, 2020, pp. 3570-3625, at p. 3570 (Providing recent empirical evidence of a quality-enhancing impact from vertical integration).

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benefiting from higher quality and more favorable prices in connection with Google's management of an integrated ad tech stack.

***1. Total Demand for Display Ads and Display Ad Prices Are Consistent with Competitive Outcomes***

409) Data indicate that there was exponential growth in the total demand for display ads<sup>698</sup> during the period in which Google was allegedly engaging in business practices to harm competition.<sup>699</sup> Demand increased by over 19 times, from under \$8 billion in 2008 to over \$147 billion in 2023. This growth undermines Professor Gans' assertions that Google's conduct harmed competition.

410) Data show that, despite the over 1,900 percent increase in the demand for display advertising and the improved quality stemming from Google's integration and investments, prices paid for advertisements using Google Ads—the cost-per-click—declined from about [REDACTED] at the launch of AdX 2.0 in September 2009 to about [REDACTED] in September 2022.<sup>700</sup> Similarly, the cost to DV360 advertisers has also been steadily decreasing. Data show DV360 cost per click reducing from [REDACTED] in August 2016 to [REDACTED] in August 2022.<sup>701</sup> The decline in cost to the advertiser is also reflected in the value provided to the advertisers. Data also show conversions per dollar as well as click-through rates rising for DV360

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<sup>698</sup> eMarketer's data, which represent the company's annual estimates of ad spending based on public revenue reports, market trends, and estimates of other analysts, among other factors, provide a *general approximation* of actual trends from this period. Still, their aggregate market-level view is helpful and the company is "widely regarded as the first place to look for research about marketing in a digital world." (Evelyn Smith, "New Resource: eMarketer Pro," Brock University, March 15, 2018, available at: <https://brocku.ca/library/2018/03/15/4623/>).

<sup>699</sup> See Exhibit 8. Exhibit 10 shows that increases in ad spending are not purely due to a composition effect as users adopt mobile devices.

<sup>700</sup> See Exhibit 5. Cost per click (or CPC) is a measure of the dollars spent or received on advertisements per click. Advertisers may prefer to be billed on a CPC basis if the goal of their ad campaign is to generate sales or produce other forms of engagement from users. (Criteo, "What's the Difference Between CPC and CPM?" April 12, 2017, available at: <https://www.criteo.com/blog/whats-difference-cpc-cpm/>).

<sup>701</sup> See Figure 105. Variation in the CPC for DV360 in 2015 and early 2016 appears related to low volumes recorded in the data during this period of time.



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advertisers during this period.<sup>702</sup> Conversion per dollar, a measure of the return on advertising spend, increased from less than [REDACTED] conversions per dollar in January 2017 to [REDACTED] conversions per dollar in August 2022.

411) The fact that the prices advertisers paid for clicks steadily declined following Google's integration across the ad tech stack and the launch of AdX 2.0 in September 2009 undermines Plaintiffs' narrative.<sup>703</sup> Instead, these patterns are consistent with the procompetitive benefits discussed above.

***2. Declining Quality-Adjusted Prices for Ad Tech Products Are Consistent with Competitive Outcomes***

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<sup>702</sup> See Figure 106 and Figure 104. Variation in the conversions per dollar spent for DV360 in 2015 and early 2016 appears related to low volumes recorded in the data during this period of time.

<sup>703</sup> The government data in Figure 46 suggests that, despite the lower prices paid by advertisers, the prices newspaper publishers received for ads (with both online and offline recorded together until 2015) did not decline following the launch of AdX 2.0. (Although the prices that online and offline newspapers received for their ads were reported together in government data until 2015, these data can still provide helpful insight into trends in the advertising industry over the past decades.) The top (green) series is the producer price index (PPI) for ads in newspapers, which tracks the prices newspaper publishers received for newspaper ads. The bottom (yellow) series is the overall PPI, which tracks the prices producers received for all goods and services, and the two middle series are consumer price indices (CPI), which track the prices that consumers paid for goods and services. Between 1981 and 2008, newspaper publishers were able to increase their ad prices at twice the amount other producers raised their prices, and almost twice the increase in the prices of goods and services that consumers purchased. As the figure shows, beginning in 2008 this trend of rising prices abruptly changed; newspapers were no longer able to increase ad prices twice as fast as other producers, and the PPI for newspaper ads started tracking the overall PPI—which was flat beginning with the great recession in 2008.

As shown in Figure 47, the PPIs for print and digital newspapers display similar trends. Consistent with the academic literature, the trends in Figure 46 and Figure 47 together suggest that events unrelated to Google's business practices—such as consumer shifts away from traditional mainstream media, lasting effects of the great recession, and the business decisions of newspapers and advertisers—could have adversely impacted the advertising revenues of newspapers. Failure to control adequately for these and other factors could lead to false positives—that is, to falsely attribute harm from “spurious” events that are outside of Google's control to the allegedly anticompetitive business practices. This risk is exacerbated because a given spurious event may impact different advertisers or publishers at different points in time.

By way of example, Figure 107 and Figure 108 show that the prices received for ads by publishers in the periodicals segment and the directories & mailing list segments were also increasing at rates significantly higher than the overall PPI, but these prices leveled off much later than for newspapers (approximately 2019 for periodicals and 2013 for directories & mailing lists). Additionally, the PPI for ads in the directories & mailing list segment declined abruptly in 2016. In short, there are also heterogeneities in the timing and magnitude of spurious events.

See, e.g., Robert Seamans and Feng Zhu, “Responses to Entry in Multi-Sided Markets: The Impact of Craigslist on Local Newspapers,” *Management Science*, Vol. 60, No. 2, 2014, pp. 476-493; Hsiang Iris Chyi and Ori Tenenboim, “Charging More and Wondering Why Readership Declined? A Longitudinal Study of U.S. Newspapers' Price Hikes, 2008–2016,” *Journalism Studies*, Vol. 20, No. 14, 2019, pp. 2113-2129.

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412) The prices that Google charges for its ad tech products have not increased, despite increases in quality and total output. These patterns are consistent with Google's integration and business practices being procompetitive, and they undermine Plaintiffs' anticompetitive foreclosure narrative.

413) Despite the 19 times increase in the total demand for digital ads and the substantial increases in click-through rates for U.S. advertisers buying display ads (narrow) via DV360,<sup>704</sup> the fees paid by advertisers using Google's DV360 technology have fallen over time.<sup>705</sup> Google's margin for advertisers using Google Ads also has not increased nor has the integrated margin of Google Ads increased<sup>706</sup>—despite the increase in the click-through rate for U.S. advertisers buying display ads (narrow) via this ad buying tool.<sup>707</sup> In short, the quality-adjusted fees that Google charges for its buying tools have declined. Google's declining quality-adjusted fees for DV360 and Google Ads, coupled with stable or declining revenue shares on AdX,<sup>708</sup> means that Google has not been pocketing the fruits of its investments to better match advertisers with publisher impressions. Instead, it has been passing those benefits on to advertisers in the form of lower quality-adjusted prices for display ads.

<sup>704</sup> See Figure 104.

<sup>705</sup> See Exhibit 2.

<sup>706</sup> See Exhibit 6, and Exhibit 16. I note that in the ordinary course, Google tracks a margin for combined, rather than separate, Google Ads and AdX transactions. For purposes of these figures, I estimate a margin for Google Ads in isolation (shown in Exhibit 6) by excluding the AdX revenue share from the combined margin (shown in Exhibit 16). In fact, Google Ads does not charge a fixed impression fee or percentage of ad spend to advertisers who purchase clicks. These numbers are based on the estimated overall Google Ads margin in 2019, and “this is not a fixed per-impression fee. As Google Ads does not charge advertisers for most impressions, the amount it retains varies over time.” (██████████, “How our display buying platforms share revenue with publishers,” Google Ad Manager, June 23, 2020, available at: <https://blog.google/products/ads-commerce/display-buying-share-revenue-publishers/>).

<sup>707</sup> I note that, since the quality (measured by the click through rate) of the ads purchased by Google Ads advertisers increased by [REDACTED] from January 2008 to January 2022, even if there had been increases in the Google Ads margin (or increases in the CPM for ads purchased on Google Ads), one could not infer that these increases harmed advertisers. *See* Figure 103.

<sup>708</sup> See Exhibit 18.

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414) The data are also inconsistent with Professor Gans' narrative that Google's business practices harmed publishers by foreclosing competition in his candidate markets for ad exchanges. Google's overall revenue share for transactions on AdX has not increased.<sup>709</sup> Data also demonstrates that any increase in total fees collected by AdX since 2013 have been driven by trends in total impressions transacted.<sup>710</sup> When more impressions are transacted, AdX collects more in nominal fees, but its revenue share has remained consistent over the years. Therefore, Google has incentives to grow the ecosystem as a whole to increase its own bottom line.

415) Finally, documents<sup>711</sup> and data indicate that the ad-serving fees that Google charged publishers for its ad server declined over time.<sup>712</sup> This is, once again, consistent with the elimination of double marginalization and beneficial price reductions arising from Google accounting for the positive externalities of lower server fees on advertisers and the digital ad ecosystem as a whole. As reflected by the data, the total fees collected by DFP appears to have remained relatively steady while the total impressions served has increased.<sup>713</sup>

416) Taken together, data—including the observed declines in the prices advertisers pay for ads, increases in both total output and quality, stable revenue share, and declining ad server fees—undermine

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<sup>709</sup> See Exhibit 18. These patterns are generally robust to alternative ways of examining the data. See Figure 50 for results by transaction type, limited to display ads.

<sup>710</sup> See Exhibit 17.

<sup>711</sup> For example, a 2010 pricing document indicates that ad serving fees “declined steeply” from April 2008, despite the fact that “[a]d serving volumes had been steadily growing in all regions.” (GOOG-DOJ-09841308, at -312 and -324.)

<sup>712</sup> See Exhibit 4. These patterns are generally robust to alternative ways of examining the data. See Figure 109. I note that the pattern of ad serving fees for publishers not using AdX is inconsistent with Professor Gans' theory that Google leverages AdX to force publishers to pay higher prices to use DFP.

<sup>713</sup> See Figure 110.

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the hypothesis that Google's business strategies over the past 15 years harmed customers in Professor Gans' candidate markets. Rather, the above data displays are consistent with Google's ad tech growing output and creating win-win outcomes: advertisers, publishers, and users have all benefited from Google's investments and management of its integrated ad tech stack over the past 15 years. While these 15-year trends in non-increasing prices and higher quality might have negatively impacted some of Google's competitors, this is consistent with competition on the merits, and these trends are not consistent with anticompetitive foreclosure.

**C. Growth in the Number and Scale of Competitors Is Inconsistent with Anticompetitive Foreclosure**

417) In this section I show that the number of competitors has grown over the last decade, not declined. Data also indicate that Google's competitors have enjoyed increases in volume and, therefore, scale. This conclusion is robust to measuring volume in terms of number impressions, the value of impressions, fees collected, and number of connections. Taken together, these patterns are inconsistent with Plaintiffs' and Professor Gans' assertions that Google has foreclosed competition or otherwise deprived rivals of scale.<sup>714</sup>

418) Professor Gans has not only failed to identify the minimum efficient scale required for a competitor to "successfully compete," he has not demonstrated that failure to achieve or maintain

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<sup>714</sup> Plaintiffs claim that "Google's exclusionary conduct has caused a wide range of anticompetitive effects, including [...] the exit of rival firms, and foreclosed entry in the relevant antitrust markets." (Fourth Amended Complaint, at ¶502). In particular, Plaintiffs allege that "Google's exclusionary conduct [...] caused competing publisher ad server to exit the market or significantly scale back their offering, [...]" and that "[t]he entry of new competition has been remarkably weak for over a decade, as new entrants are thwarted by Google-created barriers to entry and expansion insurmountable to even large tech companies with comparable scale and market capitalization." (Fourth Amended Complaint, at ¶¶508, 509).

See Gans Report, at ¶19. ("Google has the incentive and ability to engage in this harmful, anticompetitive conduct because of its vertically integrated structure or ownership and control of products along the ad tech stack. The end result is a less competitive online display advertising industry in the United States [...] than would be supplied in a competitive market.").

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minimum efficient scale stems from anticompetitive foreclosure. Professor Gans has not reliably shown that Google's rivals have diminished in size or scale in ways that prevent them from attracting Google's customers were they to offer products that customers value. A rival may lack scale or even exit simply because they are casualties of healthy competition. Professor Gans' conclusions ignore plausible alternatives, including that customer preferences for Google's products and that market participants (including advertisers, publishers, and ad tech rivals) make decisions and impose restrictions that can adversely impact their and others' businesses.

***1. The Number and Scale of Competitors Has Grown, Not Declined***

419) Even using Professor Gans' narrow definition of display ads, the number of competitors has grown. The number of advertiser buying tools has remained flat from 2013 to 2023.<sup>715</sup> The number of exchanges used by AdX and DFP publishers to purchase display ads (narrow) has increased from 40 in May 2020 to 48 in March 2023.<sup>716</sup> These data are inconsistent with foreclosure of buying tools or ad exchanges. As I have noted, data in the record do not allow one to systematically analyze the number of rival publisher ad servers or examine their scale in Professor Gans' narrow candidate market. However, because the top [REDACTED] of publishers account for almost [REDACTED] of DFP impressions, a rival ad server would only need to attract a small number of publishers to achieve significant scale.

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<sup>715</sup> Figure 92 shows the number of buying tools bidding into AdX to purchase Display Ads (Narrow) and the number of buying tools bidding into AdX to purchase Display Ads according to the broad definition.

<sup>716</sup> Exhibit 19 shows the number of exchanges to which GAM publishers connect to sell Display Ads (Narrow) via Open Bidding or Header Bidding according to AdX and DFP data.

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420) I also examine the possibility that Google’s business practices foreclosed the volume of impressions transacted by rival ad tech companies. First, data are inconsistent with the hypothesis that Google foreclosed competition in Professor Gans’ candidate exchange market.

421) Exhibit 23 shows the aggregate volume of impressions transacted by third-party exchanges (based on Google data) has increased over time, which is the opposite of what one would observe had there been foreclosure.<sup>717</sup> Second, data are inconsistent with Professor Gans’ hypothesis that Google foreclosed competition in his candidate market for small advertiser buying tools. Exhibit 23 shows the aggregate volume of impressions transacted by third-party exchanges is larger than the total volume of impressions that AdX transacts from advertisers using Google Ads. This is not only inconsistent with foreclosure but also inconsistent with Plaintiffs’ and Professor Gans’ assertion that publishers “must have” AdX to access advertiser demand.<sup>718</sup> [REDACTED]

[REDACTED] 719 [REDACTED]

[REDACTED] 720 [REDACTED]

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<sup>717</sup> Figure 111 shows widespread increase in volume of transactions on rival exchanges through header bidding and Open Bidding. Figure 112 shows similar patterns for the value of ads transacted on these exchanges.

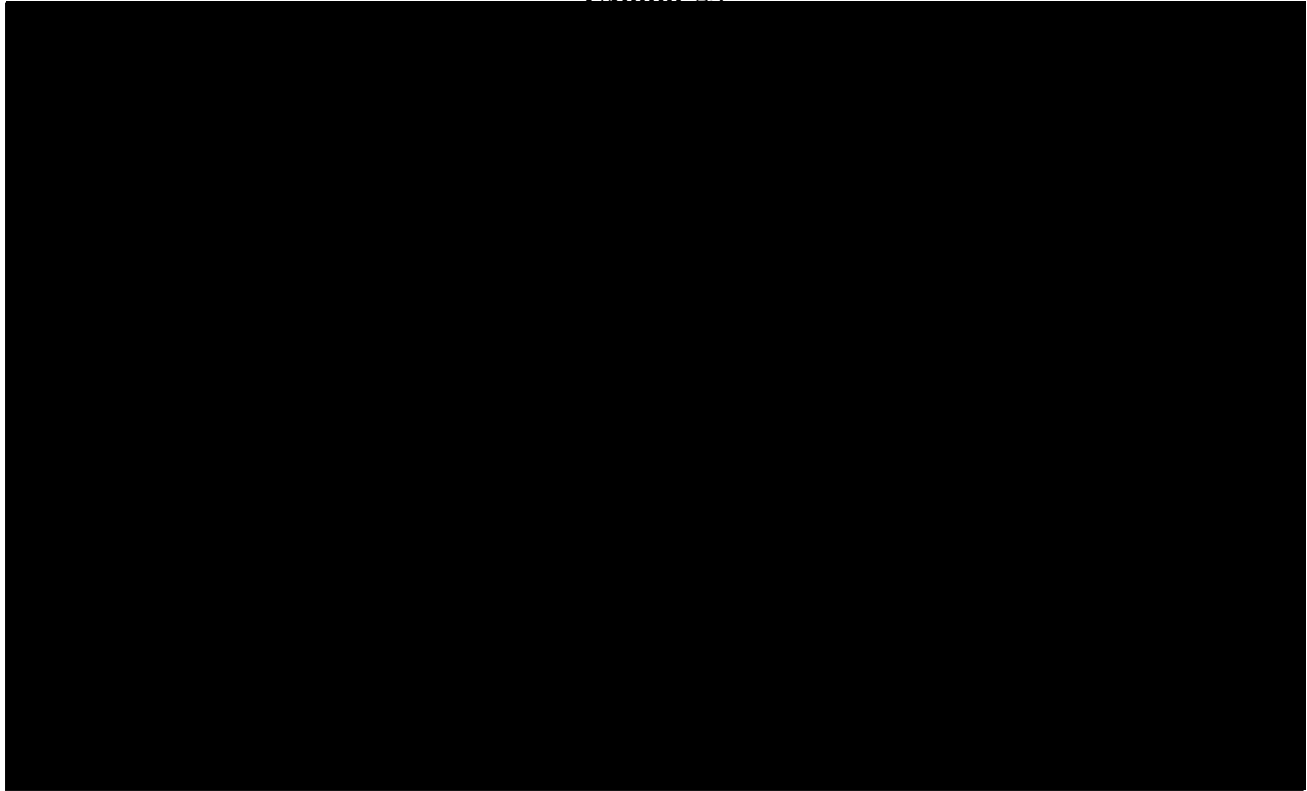
<sup>718</sup> Fourth Amended Complaint, at ¶148. (“The significance and uniqueness of Google Ads demand in Google’s exchange render Google’s exchange a “must have” for publishers.”). *See* Gans Report, at ¶416(a) (“Around the same time, Google limited its ad-buying tool for small advertisers to Google’s ad exchange (AdX), making Google Ads demand exclusive to AdX amongst exchanges, and leading publishers to consider AdX a ‘must-have’ exchange.”).

<sup>719</sup> [REDACTED]

<sup>720</sup> See [REDACTED]

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**Exhibit 23**



Notes: Third party exchange impressions comprise Open Bidding and header bidding impressions. Impressions transacted through Header Bidding do not exclude any reservation type.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

422) My conclusion that Google did not foreclose the ability of rival ad buying tools to obtain volume is robust to the use of alternative datasets and using alternative measures of volume.<sup>721</sup>

423) As a robustness check, I also examined the possibility that Google's business practices foreclosed rival ad tech companies' access to advertisers and publishers. Although Google data identify only a subset of advertisers that bid into AdX from rival DSPs, these data show many ad buying tools

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<sup>721</sup> Available data from Google on the volume of transactions on third-party buying tools is also inconsistent with foreclosure. Figure 115 shows widespread increases in the volume of impressions advertisers purchase through rival ad buying tools. Figure 116 shows that this conclusion is robust to using ad spend to measure volumes. [REDACTED]

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each utilized for purchase of ads on behalf of thousands of advertisers.<sup>722</sup> Google data also show that advertisers' ad campaigns are deployed across multiple ad buying tools at the same time.<sup>723</sup> One would not observe these patterns had Google foreclosed competing ad tech companies.

424) As another robustness check, I examine whether there is any evidence that Google foreclosed the ability of publishers to access third-party exchanges. The data reflect the opposite of foreclosure: widespread increases in the number of publishers selling their inventory through a variety of competing exchanges are observed in the data.<sup>724</sup> I also examine whether there is any evidence that Google foreclosed the ability of publishers to multi-home on different exchanges. Again, the data are inconsistent with foreclosure. The average number of exchanges through which Google's AdX and DFP publishers sell ads has grown from about 2.0 exchanges in 2018 to about 3.7 exchanges in 2023.<sup>725</sup>

425) The data also are inconsistent with the hypothesis that Google has foreclosed the ability of advertisers to access third-party exchanges: Exhibit 24 shows that the number of third-party exchanges that advertisers access through DV360 has grown: advertisers in the U.S. used more than 40 different ad exchanges in 2016, growing to at least 45 by 2020. Data also reject the hypothesis that Google has foreclosed the ability of advertisers to multi-home on third-party exchanges: Exhibit 25 shows that the median U.S. advertiser on DV360 has bid on 10 or more ad exchanges for transactions each month since

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<sup>722</sup> Figure 119 shows the monthly number of advertisers for five rival ad buying tools with the largest number of advertiser customers, between July 2016 and June 2023, the time period available in the data.

<sup>723</sup> See Figure 120. Figure 121 shows the average number of ad buying tools used by the subset of advertisers that can be identified in bidding data from rival buying tools. Google data only specify advertisers associated with third-party buying tools from July 2016 and June 2023 and the set of advertisers that could be identified appears to have changed over time.

<sup>724</sup> Figure 122 demonstrates similar outcomes using Plaintiffs' narrow definition of display ads.

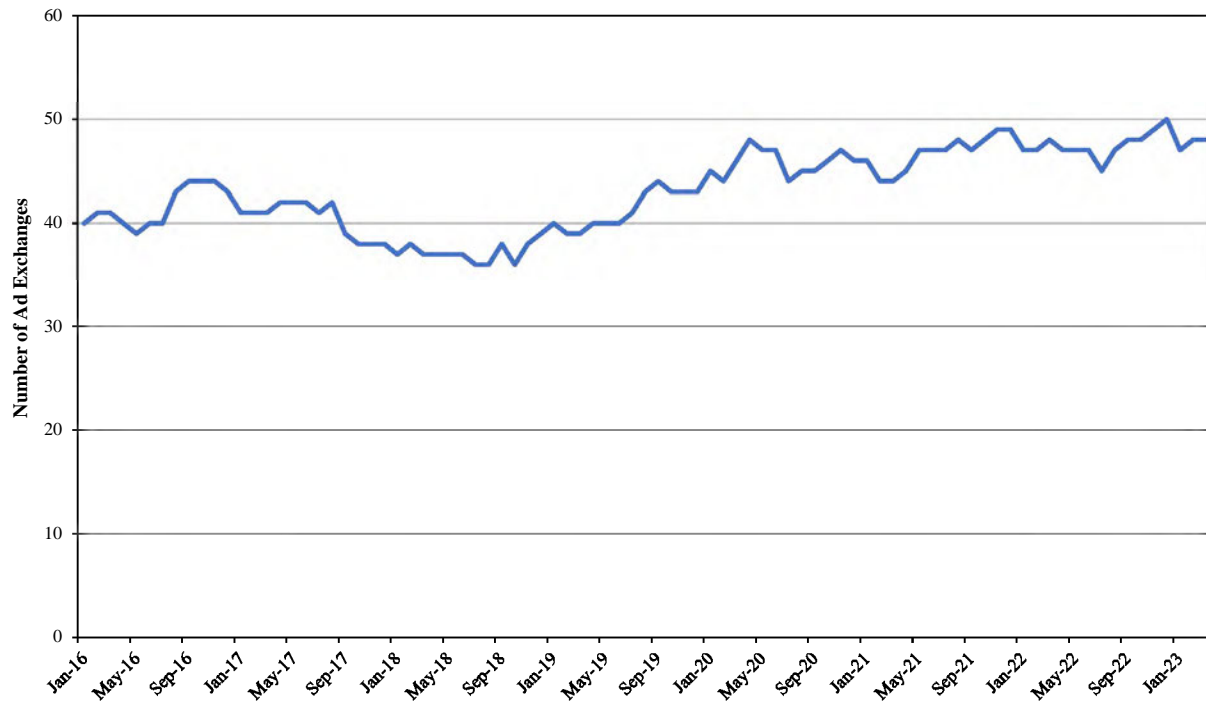
<sup>725</sup> See Figure 93.



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January 2016, and that number has grown to almost 20 since early 2021. Ad exchanges are also connecting to and transacting with a growing number of U.S. advertisers on DV360.

**Exhibit 24**  
**Total Number of Third-Party Ad Exchanges with which U.S. Advertisers Transacted via DV360**  
**January 2016 - March 2023**

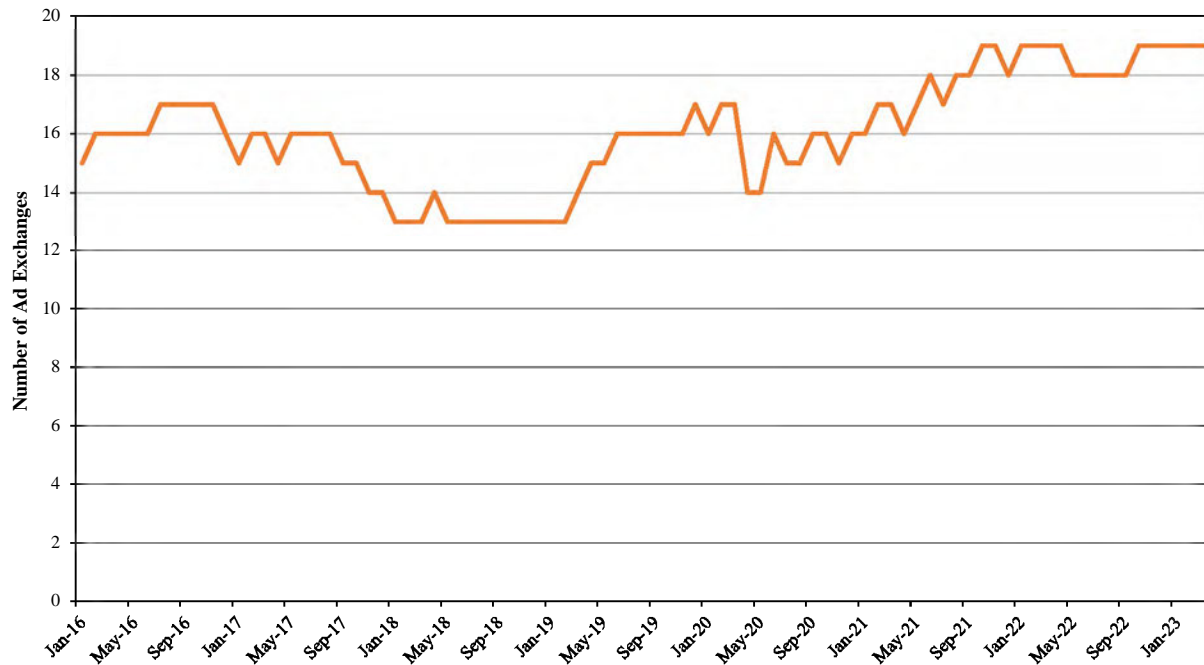


Notes: Values represent the number of unique ad exchanges as defined by the exchange\_name field connecting to and transacting with all U.S. advertisers on DV360 in a given month. Counts exclude Google's tools like AdSense, AdMob, AdX, Gmail, or TrueView. Data are not limited to display ads (narrow).

Source: MDL RFP 243 DV360 Data.

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**Exhibit 25**  
**Median Number of Third-Party Ad Exchanges with which U.S. Advertisers Transacted via DV360**  
**January 2016 - March 2023**



Notes: Values represent the median number of ad exchanges as defined by the exchange\_name field being used by each U.S. advertiser on DV360 in a given month. Counts exclude Google's tools like AdSense, AdMob, AdX, Gmail, or TrueView. Data are not limited to display ads (narrow).

Source: MDL RFP 243 DV360 Data.

426) Data shows that Google has not foreclosed the ability of third-party exchanges to access advertisers using Google's ad buying tools; data indicate widespread increases in the number of advertisers accessing rival ad exchanges from DV360.<sup>726</sup> Of the top 20 ad exchanges transacting with buyers using DV360, most connected to about 4,600 advertisers per month in early 2016, with the number of connections growing to approximately to 19,000 advertisers per month by early 2023.<sup>727</sup> The data also demonstrates that nearly the same number of DV360 advertisers buy ads through several of the

<sup>726</sup> See Figure 123.

<sup>727</sup> See Figure 123.

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top rival ad exchanges as those that buy ads through Google's AdX. Additionally, some competitors (e.g., SmartRTB and YieldMo) that entered with relatively few connections to advertisers, rapidly grew their connections to rival those of AdX.<sup>728</sup>

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428) Public information is consistent with these findings. Public data indicate that there are 85 ad tech rivals (e.g., exchanges and ad networks) listed as authorized sellers on the ads.txt files of more than 100,000 publisher domains.<sup>731</sup> Finally, public financial information and public statements by

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<sup>728</sup> Only 2 of the top 20 exchanges reduced their connections to U.S. DV360 advertisers to zero.

<sup>729</sup>

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<sup>731</sup> See Well-known.dev, "Well-Known Resource Index," available at: [https://well-known.dev/resources/ads\\_txt/ad-systems/?q=status%3A\(failed+OR+ok\)&sort=-ads\\_count%2Csystem#results](https://well-known.dev/resources/ads_txt/ad-systems/?q=status%3A(failed+OR+ok)&sort=-ads_count%2Csystem#results). Accessed June 6, 2024.

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Google's competitors are inconsistent with Google depriving them of scale or otherwise foreclosing their ability to compete.<sup>732</sup>

**2. *Professor Gans' Analysis of Foreclosure Ignores the Impact of Customer and Rival Decisions on Outcomes***

429) Even if, contrary to the data, Professor Gans had shown that rivals lost volume, this would not establish that Google engaged in anticompetitive behavior. Vigorous competition can result in winners and losers among competitors—i.e., some firms may gain customers (and, hence, scale) at the expense of rivals.<sup>733</sup> Improving the performance of products (or introducing new products) is procompetitive even if customers will “beat a path to the door” of the firm that builds a better mousetrap while makers of old mousetraps go out of business.<sup>734</sup> In the case at hand, rivals' scale depends on a variety of factors that Google does not control. For example, rivals' investment decisions impact the quality and attractiveness of their ad tech to customers, potentially resulting in low transaction volume. These decisions materially impact outcomes. Professor Gans' conclusions regarding foreclosure are unreliable because they fail to account for these factors.

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<sup>732</sup> See Appendix IV for additional details.

<sup>733</sup> For instance, Oliver Williamson, a winner of the Nobel Memorial Prize in Economic Sciences, notes: “One of the key features of competition—of the normal, everyday, garden variety, procompetitive kind—is that it generates both winners and losers . . . . The enterprise system plays hardball. Provided that the rules of the game are being observed, the experience of individual competitors is of no concern. Indeed, to intrude in the process by protecting individual competitors against hardball outcomes is contrary to competitive logic and prevents merit outcomes from being realized . . . . The fate of individual competitors is relevant only as this relates to an assessment of whether the competitive process is operating in a meritorious way.” (Oliver E. Williamson, *Antitrust Economics: Mergers, Contracting, and Strategic Behavior*, Blackwell Publishers, 1987, at pp. 297; 300).

<sup>734</sup> “Build a better mousetrap, and the world will beat a path to your door” is a phrase commonly attributed to Ralph Waldo Emerson. (See, e.g., Jack Hope, “A Better Mousetrap,” *American Heritage Magazine*, October 1996, available at: <https://www.americanheritage.com/better-mousetrap>).

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430) Documents and data indicate rival ad tech companies' scale depend not only on their decisions, but the decisions of advertisers, publishers, and users. Advertisers<sup>735</sup> and publishers<sup>736</sup> choose to expand or contract the set of ad tech firms with which they do business. This behavior can relate to a paring down of relationships to those most effective and highest quality and a desire to reduce the hassle costs of simultaneously maintaining large numbers of relationships.<sup>737</sup> Customers may also drop relationships with exchanges owing to a change in business strategies,<sup>738</sup> pursuing an entirely different revenue model,<sup>739</sup> as well as a wide variety of other reasons unrelated to foreclosure. Users may choose to utilize technology (e.g., ad blockers and private web browsing) in ways that directly impact the ability of publishers to monetize content and the value that advertisers receive from their ad spend.

431) Google's ad tech gives advertisers and publishers considerable control over their own destiny. For example, Google Ads and DV360 permit individual advertisers to prevent their ads from appearing on specified websites.<sup>740</sup> Likewise, DFP allows individual publishers to prevent specified ads from being displayed on their websites.<sup>741</sup> Google's ad tech allows advertisers and publishers to change

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<sup>735</sup> See, e.g., Alyssa Boyle, "Why Lenovo Is Consolidating Its Ad Tech," AdExchanger, September 21, 2023, available at: <https://www.adexchanger.com/marketers/why-lenovo-is-consolidating-its-ad-tech/>. Accessed August 4, 2024.

<sup>736</sup> See, e.g., Internet Archive, "Why some of the largest publishers are breaking up with ad tech middlemen," available at: <https://web.archive.org/web/20221130173005/https://digiday.com/marketing/it-changes-the-dynamics-some-of-the-largest-publishers-are-breaking-up-with-ad-tech-middlemen/>. Accessed March 18, 2024.

<sup>737</sup> Sarah Sluis, "More Publishers Are Breaking Up With Resellers," AdExchanger, April 29, 2019, available at: <https://www.adexchanger.com/publishers/more-publishers-are-breaking-up-with-resellers/>.

<sup>738</sup> Jessica Davies, "After GDPR, The New York Times cut off ad exchanges in Europe – and kept growing ad revenue," DigiDay, January 16, 2019, available at: <https://digiday.com/media/gumgumtest-new-york-times-gdpr-cut-off-ad-exchanges-europe-ad-revenue>.

<sup>739</sup> Chrish Roush, "Seeking Alpha to end third-party ads on site," TBN, December 22, 2021, available at: <https://talkingbiznews.com/they-talk-biz-news/seeking-alpha-to-end-third-party-ads-on-site/>.

<sup>740</sup> For example, Disney may not want its advertisements to appear on a site that is known for illegally reselling tickets to its theme parks.

<sup>741</sup> For example, a religious blog may want to restrict the types of advertisers and creative content that can appear on its site. The blog in this example may leverage DFP to restrict advertisements for R-rated films or bikini-clad women from appearing on its site.

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these settings in real time, and therefore these actions may have varying effects on a given advertiser's or publisher's economic experiences over time. There are numerous other dimensions in which advertisers' and publishers' individual decisions impact their own destiny. For publishers, these include ad content restrictions, inventory formats and sizes, participation in Open Bidding, and website popularity.<sup>742</sup> For advertisers, these include targeting specifications, website content restrictions, conversion goals, advertising budgets, effectiveness of creatives, programmatic buying versus self-managed, and cost basis.<sup>743</sup> Professor Gans' limited data analyses do not control for these and other decisions that vary across advertisers, publishers, and ad tech companies and evolve over time—just as consumers' preferences for brands and publishers including FOX, CNN, Bud Light and Disney evolve over time. This further degrades the reliability of his conclusions regarding the purported anticompetitive impact of Google's business decisions.

432) Data confirm that these decisions materially impact outcomes. Consider, for example, AdX publishers' use of advertising block controls to “[block] ads from certain categories or advertisers.”<sup>744</sup> Even though the use of ad blocks can reduce the pool of buyers allowed to bid on a publisher's ad

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<sup>742</sup> Google Ad Manager Help, “Optimize floor prices in unified pricing rules (Beta),” available at: <https://support.google.com/admanager/answer/11385824>. Accessed March 1, 2023; Google Ad Manager Help, “Configure bidder creative restrictions,” available at: <https://support.google.com/admanager/answer/10179069>. Accessed August 5, 2024; Google Ad Manager Help, “Inventory Formats,” available at: <https://support.google.com/admanager/answer/9796545>. Accessed April 24, 2024; Google Ad Manager Help, “Introduction to Open Bidding,” available at: <https://support.google.com/admanager/answer/7128453>. Accessed August 5, 2024; Abhilasha Sandilya, “Google Ad Manager or Google Ad Manager 360 – What Should a Publisher Choose?” HeaderBidding, December 20, 2023, available at: <https://headerbidding.co/google-ad-manager-vs-ad-manager-360/>. Accessed August 5, 2024.

<sup>743</sup> Display & Video 360 Help, “Brand safety targeting,” available at: <https://support.google.com/displayvideo/answer/3032915>. Accessed August 5, 2024; Google Ads Help, “About conversion goals,” available at: <https://support.google.com/google-ads/answer/10995103>. Accessed August 5, 2024; Google Ads Help, “About Ad Strength,” available at: <https://support.google.com/google-ads/answer/9142254>. Accessed August 5, 2024.

<sup>744</sup> Publift, “Google AdX vs Google AdSense: Which Is Better for You?” available at: <https://www.publift.com/blog/google-adx-vs-google-adsense>. Accessed April 16, 2024.

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inventory, they help publishers control the quality of ads to enhance the experiences of users. Data also show that the number of publishers using ad blocking increased from 1.99 percent in July 2017 to 11.67 percent in March 2023.<sup>745</sup>

433) Google data indicate that the independent choices of rival ad tech companies impact the volume of impression they transact. Rival ad tech providers cannot win impressions unless they participate in auctions; however, data indicate that [REDACTED] of the time rival exchanges do not receive calls for bids on publisher inventory due to the filtering choices that the third-party exchange or its bidders put in place, and [REDACTED] of the time rival DSPs do not receive calls to bid due to filtering choices made by the DSPs.<sup>746</sup> These data show that about [REDACTED] of bid requests that AdX sends to DSPs receive no response from the DSP, about [REDACTED] of bids submitted through rival exchanges are below publishers' reserve prices, and, when these ad tech companies respond with a bid above the publisher's reserve price, [REDACTED] of the time they lose because their bid is below other bidders. These data indicate that Google has not foreclosed the opportunity of advertisers and publishers to buy and sell significantly more display ad impressions through third-party DSPs and ad exchanges.

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<sup>745</sup> See Figure 126. Economic theory indicates that, other things equal, blocking advertisers reduces a publisher's revenue today (because there are fewer bidders) but increases future revenues if this blocking makes the publisher's website more attractive to internet users. Data show that variation in publishers' usage of blocking and its relation to impressions and revenue.<sup>746</sup> Figure 127 and Figure 128 show that outcomes of ad tech rival companies are highly dependent upon their own decisions and factors outside of Google's control. Figure 127 describes possible outcomes upon buyers receiving a bid request. Columns a) and b) correspond to requests sent to rival ad exchanges through Open Bidding. Columns c) and d) correspond to requests sent to rival DSPs observed on AdX. Highlighted values in these tables show that among rival DSPs utilizing AdX, Google is only responsible for filtering very small shares of bid request and bid outcomes.

<sup>746</sup> Figure 127 and Figure 128 show that outcomes of ad tech rival companies are highly dependent upon their own decisions and factors outside of Google's control. Figure 127 describes possible outcomes upon buyers receiving a bid request. Columns a) and b) correspond to requests sent to rival ad exchanges through Open Bidding. Columns c) and d) correspond to requests sent to rival DSPs observed on AdX. Highlighted values in these tables show that among rival DSPs utilizing AdX, Google is only responsible for filtering very small shares of bid request and bid outcomes.

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434) Professor Gans reports a handful of statistics based on a sample of 100 million queries of “Open Auction” and “Open Bidding” data and indicates that advertisers using Google buying tools frequently win and participate in auctions with fewer bidders.<sup>747</sup> While he draws no formal conclusions from his summary statistics, he insinuates that this stems from the monopoly power he asserts Google possesses.<sup>748</sup> My analysis of Google auction-level data reveals that Professor Gans’ description of the data is incomplete. The data indicate that rival ad tech companies do not win auctions for a variety of reasons that have nothing to do with Google’s business decisions and that there is substantial variation across ad tech companies in the reasons that their bids fail to win impressions.<sup>749</sup> For example, over [REDACTED] of Criteo (US)’s bids on impressions lose because they are below the floor price, and they win less than [REDACTED] of the auctions when their bids are above the price floor. Index Exchange wins almost [REDACTED] of the auctions it bids on and rarely submits a bid below the publisher’s price floor—over [REDACTED] of their bids merely lose to a higher price from another bidder. Magnite wins almost [REDACTED] auctions to which it submits bids, which is roughly equivalent to the rate observed for DV360 bidders. Several bidders see a large proportion of their bids blocked by publisher settings: Zemanta and Conversant bids are blocked by publishers on more than [REDACTED] of their bids. Some bidders lose a

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<sup>747</sup> See Gans Report, at ¶¶816-819.

<sup>748</sup> “I find that in [REDACTED] of auctions where Google Ads won, Google Ads was the only participant. In those auctions, Google’s ad tech tools have the flexibility to raise take rates as much as needed without any risk of losing the impression to a competitor.” (Gans Report, at ¶817.) Professor Gans’ speculation is inconsistent with the data on Google’s integrated margin I showed in Exhibit 16.

<sup>749</sup> Figure 129 summarizes the win/loss reasons identified for bidders in auction-level data. The discussion in this paragraph refers to calculations based on this figure. My analysis considers all auctions covered from June 1, 2023 through June 14, 2023, amounting to approximately [REDACTED] auctions covering approximately [REDACTED] bids.<sup>750</sup> See Figure 130. See also GOOG-AT-DOJ-DATA-000247050 (“DFP Fees.”). Impressions may go unfilled because, for example, (a) all bids submitted are below the publisher’s thresholds; (b) bidders choose to abstain from the auction; (c) the publisher blocks bidders; (d) the user lacks adequate or any targeting information—which can happen with increasing use of private browsing, new arrival to the publisher, the user rejecting cookies, or the publisher not communicating the targeting information—and/or (e) bidders lacking the budget/bandwidth to respond with bids.



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relatively large share of auctions owing to issues with their bids such as violations of policies or not sending a valid ad with the bid. Over [REDACTED] of The Trade Desk's bids do not win for these reasons.

435) Almost [REDACTED] of the ad queries that publishers send to DFP are not monetized; data indicate that, since 2020, approximately [REDACTED] of publishers' ad queries are not monetized because they are either unfilled or served with house ads.<sup>750</sup> These data suggest that the capacity to buy and sell ads greatly exceeds the volume of ads that are currently transacted. Therefore, the ability of exchanges and networks to grow their share is not limited by Google's ad tech but by several other factors specific to advertisers, publishers, and users of websites.

436) Finally, publishers use different methods to market their ad inventory and these choices change over time.<sup>751</sup> Broadly, the number of publishers using Open Bidding and header bidding exchanges to sell their ad inventory has substantially increased from June 2018 to March 2023.<sup>752</sup> These patterns are inconsistent with Professor Gans' narrative that Google has foreclosed rival exchanges' access to publishers.

437) Professor Gans ignores that business practices impacting rivals' access to products are not necessarily harmful to competition and may preserve the quality and reputation of products to the benefit of customers and users.

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<sup>750</sup> See Figure 130. See also GOOG-AT-DOJ-DATA-000247050 ("DFP Fees."). Impressions may go unfilled because, for example, (a) all bids submitted are below the publisher's thresholds; (b) bidders choose to abstain from the auction; (c) the publisher blocks bidders; (d) the user lacks adequate or any targeting information—which can happen with increasing use of private browsing, new arrival to the publisher, the user rejecting cookies, or the publisher not communicating the targeting information—;and/or (e) bidders lacking the budget/bandwidth to respond with bids.

<sup>751</sup> See Figure 131.

<sup>752</sup> See Figure 122.

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**D. Professor Gans Mistakes Procompetitive Growth in Google's Business for Anticompetitive Foreclosure**

438) Professor Gans asserts that business practices that result in increases in AdX's share of DFP impressions indicate that Google has foreclosed competition.<sup>753</sup> As a matter of economics, this is wrong. Regardless, as discussed below, I find that Google's share of DFP impressions increased not by depriving rivals of volumes, but by increasing the *total* volume of impressions (i.e., increasing the size of the pie). Thus, data indicate that Google's business practices were procompetitive. Google's gains did not come at the expense of rivals (and even if it did, as stated previously, it could have just as easily been from competition on the merits), and Google's customers benefited.

439) Professor Gans' erroneous conclusions are based on an incorrect interpretation of data which show an increase in AdX's share of DFP impressions from about [REDACTED] to [REDACTED] from December 2016 to March 2023.<sup>754</sup> However, the same pattern is also consistent with the procompetitive benefits of deeper integration and the procompetitive rationale of Google's conduct. Likewise, an increase in Google Ads' or DV360's share of impressions need not come at the expense of rival ad tech firms. For example, if the increase in Google's share comes because it is more efficient at matching than third parties (e.g., its increased share comes from filling impressions that would have otherwise not been served), this would represent a procompetitive increase in its share of DFP impressions served.

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<sup>753</sup> For example, Plaintiffs presume that Google conduct "to boost the number of impressions transacted in AdX... would necessarily come at the expense of competing exchanges." (Fourth Amended Complaint, at ¶308). *See* Gans Report, at ¶15(b) ("Google implemented various restrictions with respect to its ad server tool that had the intent and the effect of harming the competitive process and steering publishers and advertisers towards Google's own products and away from rivals' products. In particular, Google implemented restrictions as to its ad server tool with the intent and effect of substantially lessening competition in the market for ad exchanges."). *See also* Gans Report, at ¶500 ("In this section, I provide evidence that Google's introduction of UPR (i) was also motivated by Google's intent to reduce floors and increase share for its ad buying tools and (ii) allowed Google's ad buying tool for large advertisers (DV360) to clear more impressions at the expense of competitors.").

<sup>754</sup> *See* Figure 132.

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Therefore, the pattern that Professor Gans focuses on does not imply that Google's conduct was anticompetitive.<sup>755</sup> [REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]<sup>756</sup>

440) Contrary to Professor Gans' assertions, rival ad exchanges have expanded their volume during this period.<sup>757</sup> Data are inconsistent with Google's conduct having an adverse effect on header bidding,<sup>758</sup> indicating that the increase in AdX's share of impressions did not stem from "killing"<sup>759</sup>

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<sup>755</sup> Figure 133 shows the number of impressions sourced from AdX, separately for Google Ads, DV360, and RTB bidders on AdX. Impressions sourced from DV360 and Google Ads follow an increasing trend. These trends do not, on their own, imply that the increases came *at the expense of* header bidding, Open Bidding, or other demand sources.

<sup>756</sup> [REDACTED]

<sup>757</sup> Figure 134 shows impressions won by header bidding. Information on header bidding impressions in Google data begin June 2018. These data indicate that the volume of header bidding impressions rivals those of Google Ads and increased steadily throughout the period Plaintiffs claim Google's conduct harmed competition. Exhibit 23 shows third-party ad exchange volume as the combination of header bidding and Open Bidding. Similarly, these data reject Plaintiffs' hypothesis that publishers as a whole suffered decreases in impressions served as a result of Google's conduct.

<sup>758</sup> I note that Plaintiffs also assert that Google "engaged in a course of conduct to coerce participation in Exchange Bidding and exclude participation in header bidding." (Fourth Amended Complaint, at ¶375). However, Plaintiffs' allegations are inconsistent with the continued growth observed in header bidding. Professor Gans describes Exchange bidding as Google's response to competitive pressures; "Google introduced Exchange Bidding, a server-side Header Bidding protocol, in response to the competitive threat from Header Bidding." (Gans Report, at ¶604). While he characterizes certain features as providing advantages to Google (e.g., that Exchange Bidding maintained a "last look" advantage) he does not examine whether they harmed competition nor does he consider whether customers benefited from any such advantages. Professor Chandler characterizes Exchange Bidding as benefitting publishers but emphasizes the Exchange Bidding fee to suggest that it does not benefit them as much as header bidding: "Exchange Bidding can be interpreted as affording some of the advantages provided to AdX to other exchanges, since it extends the Enhanced Dynamic Allocation Last Look advantage to them, provided they pay the Exchange Bidding fee." (Chandler Report, at ¶148). Professor Chandler does not examine whether Exchange Bidding harmed competition in any relevant market. Nor does Professor Chandler examine any benefits to publishers from Exchange Bidding such as Google managing a turn-key solution to implement auctions even if among exchanges.

<sup>759</sup> Fourth Amended Complaint, at ¶352.

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header bidding.<sup>760</sup> Collectively, output at AdX and third-party exchanges have grown throughout a time of stable decline in direct deals and (non-real time) remnant ad sales.<sup>761</sup>

441) Using Professor Gans' narrow definition of display ads, Exhibit 26 shows no restriction of output<sup>762</sup> stemming from Google's conduct.<sup>763</sup> The patterns observed in the data suggest that the overall effect was to increase output and therefore did not foreclose competition.

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<sup>760</sup> See Exhibit 23, which shows the volume of impressions won by third-party ad exchanges (using Google data) and the volume of impressions won by Google Ads on AdX over time.

<sup>761</sup> Figure 135 shows that impressions won by direct deals have been in decline for several years. This is consistent with publishers viewing Google's technology for matching their impressions with advertisers as increasingly attractive relative to their own ability to negotiate deals with advertisers. These data display no change in this trend in aggregate throughout the period Plaintiffs claim Google's conduct harmed competition. Nor is there any indication that the increase in impressions through Google Ads came at the expense of direct deals.

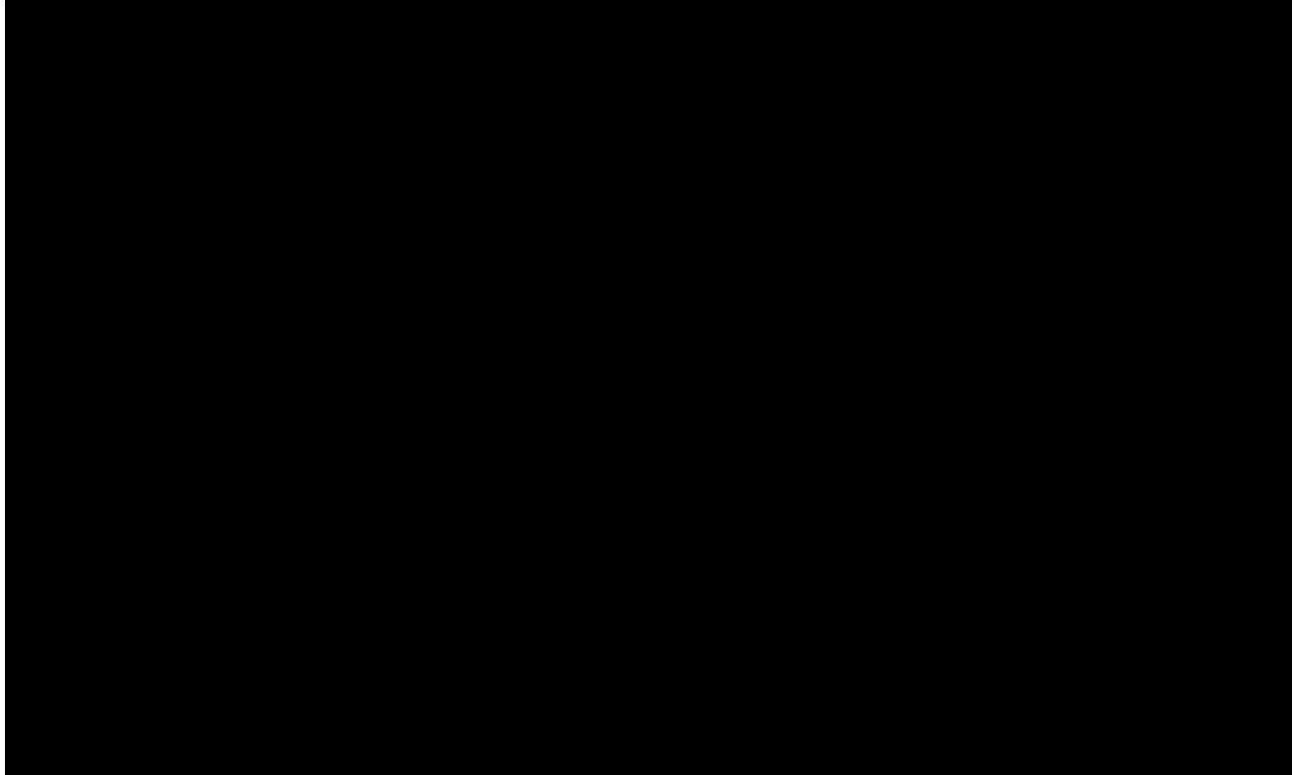
Figure 133 shows that the volume of impressions filled through DFP that did not come from Open Bidding or one of the other sources discussed above, has steadily decreased over time. These include demand sources such as bulk line items for remnant ads.

<sup>762</sup> As I have noted, Professor Gans' methodology for calculating Google's market share in his candidate ad exchange market assumes that DFP has a 100 percent share of display ad impressions. Purely for the purpose of rebutting Professor Gans' assertions that Google harmed competition in his candidate markets, my discussion output here assumes Professor Gans is correct that Google's DFP has a high market share in his candidate ad server market, so that one may use the total number of (narrow) display ad impressions served by DFP as a proxy for total output in his candidate markets. This biases results towards finding antitrust harm because Professor Gans' narrow definition of display ads ignores the growing trend by users toward mobile apps, social media, video, and walled garden platforms that could result in a decline in narrow display ad impressions served on DFP for reasons unrelated to Google's business practices.

<sup>763</sup> Similarly, Figure 136 shows that impressions on DFP for display ads (broad) increased during the same time period. House ads (which do not generate ad revenue) are included in the analysis.

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**Exhibit 26**



Notes: Data are excluding Standard and Sponsorship Line Items but including, besides others, House Ads.  
Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

**X. GOOGLE DID NOT ENGAGE IN ANTICOMPETITIVE TYING**

442) Professor Gans asserts that starting in 2016, Google began contractually tying its ad server (DFP) to its ad exchange (AdX) by using the latter's monopoly power in the ad exchange market to coerce publishers to license the former.<sup>764</sup> Professor Gans concludes that Google restricted the ability of publishers using rival ad servers to trade through AdX by allowing only publishers that license DFP to

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<sup>764</sup> Gans Report, at ¶446 ("In 2014, Google began to combine DFP and AdX into a single offering, internally referred to as "DRX." By June 2016, Google made the Unified DFP/AdX Contract (DRX Contract), a contract for DFP and AdX, the default and prevented the creation of new AdX-only contracts."); Gans Report, at ¶457 ("Google's tie relied upon Google's market power in the ad exchange market (tying market) and harmed competition in the ad server market (tied market).").

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receive competitive live bids from AdX.<sup>765</sup> According to Professor Gans, this restriction foreclosed competing publisher ad servers from “access [to] bids from advertisers using ... Google Ads” and resulted in DFP becoming the leading publisher ad server.<sup>766</sup> In this section, I explain why Professor Gans’ tying analysis is flawed and unreliable. In my opinion, the data and documentary evidence are inconsistent with the conclusion that Google tied DFP to AdX and that Google’s alleged tie harmed competition. I also find that Google’s product integrations offered significant benefits to customers.

443) After setting out an economic framework for understanding tying, I explain that Professor Gans fails to provide any reliable economic data to support his conclusion that Google tied DFP to AdX and that this alleged tie resulted in anticompetitive harm to customers. As I showed in Section IX, declining prices, increases in quality, and increases in output are inconsistent with Professor Gans’ assertion that Google’s deeper integration of its ad tech stack harmed customers. Professor Gans offers no reliable economic data that shows customers have become worse off.

444) I then explain why, based on the data and documentary evidence, there was no tie between DFP and AdX. In short, publishers using AdX were not forced to use DFP. Even assuming there was a tie (which there was not), the evidence does not support Professor Gans’ assertion that it resulted in anticompetitive foreclosure that harmed publishers. According to Professor Gans, the alleged tie allowed Google to gain market share by excluding rivals in the publisher ad server market.<sup>767</sup> This is at odds with

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<sup>765</sup> Gans Report, at ¶407 (“Google foreclosed publishers using third-party ad servers from selling to Google’s exchange.”). Gans Report, at ¶416(c) (“Starting in 2009, Google imposed technical limitations preventing publishers using third-party publisher ad servers from selling to Google’s ad exchange (AdX) in real-time open auctions.”).

<sup>766</sup> Gans Report, at ¶449 (“The effect of the contractual tie disadvantaged rivals of DFP because they no longer had access to AdX, which had unique Google Ads demand. By foreclosing ad servers from access to AdX, Google harmed the viability of these rivals.”).

<sup>767</sup> Gans Report, at ¶¶415-416 (“Google has engaged in a systematic effort to use its monopoly power in the exchange market to exclude competition in the ad server market ... [which] increase[d] [Google’s] monopoly power in the ad server market.”).

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the evidence that the share of AdX impressions served by DFP did not materially change throughout the relevant period. Professor Gans also concludes that the alleged tie enhanced Google's monopoly power and harmed publishers,<sup>768</sup> but the pricing data I examine indicate that DFP prices are low and declining.

445) I conclude that data and the record are far more consistent with DFP becoming the leading server due to Google providing a better product at a low price, rather than due to anticompetitive foreclosure. Indeed, the majority of publishers pay zero fees to use DFP. These findings are all consistent with economic theory, which as I explain below, teaches that the combination of complementary technologies such as AdX and DFP is likely to increase consumer welfare. In sum, economic theory, the record, and the data all support my opinion that Google's integration of complementary technologies did not amount to anticompetitive tying.

**A. The Economics of Tying**

446) Tying occurs when one product (the "tying" product) is sold only with another product (the "tied" product).<sup>769</sup> In other words, if a seller imposes a tie, then a customer that wants the tying product must also purchase the tied product. Tying is a ubiquitous business practice in highly competitive markets: hot dog vendors tie the sale of buns to the purchase of hot dogs, "forcing" customers on gluten-

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<sup>768</sup> Gans Report, at ¶414.

<sup>769</sup> David Evans and Michael Salinger, "Why Do Firms Bundle and Tie? Evidence from Competitive Markets and Implications for Tying Law," *Yale Journal on Regulation*, Vol. 22, 2005, pp. 37-89, at p. 38; Jean Tirole, "The Analysis of Tying Cases: A Primer," *Competition Policy International*, Vol. 1, 2005, pp. 1-25, at p. 8 (Tirole distinguishes tying from several related business practices as follows: "Tying refers to the behavior of selling one product (the tying product), conditional on the purchase of another product (the tied product). Bundling refers to the practice of selling two products together. Pure bundling means that the products are available only as a bundle. The difference between tying and pure bundling is that the tied product is available on a stand-alone basis under tying, but not under pure bundling. ... Under mixed bundling, the products are available both on a stand-alone basis and as a bundle; furthermore, the price of the bundle is smaller than the sum of the two individual prices. Pure bundling is a special case of mixed bundling, since buying the bundle is really the only feasible option if the prices of the individual products are high. Joint distribution of the two products describes a situation of bundling in which the two goods are assembled by the manufacturer rather than by the consumer ... Finally, all situations may also involve integration (i.e. some interoperability between M and C that is unavailable to C"—and therefore a lack of technological equal access).").

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free diets to pay for a bun they do not want.<sup>770</sup> The list of examples is virtually endless.<sup>771</sup> It is common for complementary products or features to be combined over time as customer demands and product features evolve. For example, power steering and automatic (versus manual) transmissions were once distinct components that car buyers had to purchase as add-ons for additional fees. Today, these components are integrated into virtually every new car that is sold in the United States.<sup>772</sup>

447) Why is tying so pervasive? As one prominent economist notes, “the most obvious reason” is that “it results in cost savings or quality improvements or both.”<sup>773</sup> Examples of such benefits include reduced transaction costs and ensuring compatibility of the products because low-quality or incompatible third-party components can damage a firm’s reputation and reduce demand for its product.<sup>774</sup> Tying

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<sup>770</sup> Publishers also engage in tying: The Dallas Morning News requires users who want a physical copy delivered to their doorstep to purchase an online version of the paper. (The Dallas Morning News, “Support Local Independent Journalism,” available at: [https://www.dallasnews.com/subscribe/dn-sub\\_button-070624-pjcnnew-z/](https://www.dallasnews.com/subscribe/dn-sub_button-070624-pjcnnew-z/). Accessed June 14, 2024).

<sup>771</sup> Other examples include: cars (tires, radios, air conditioning), laptops (monitors, operating systems, keyboards, trackpads), cell phones (calling and text messaging, integrated cameras, data plan enablement), school lunches (protein, starch, vegetable, dessert, milk), and health clubs (weights, cardio equipment, group fitness classes).

<sup>772</sup> Brake & Front End, “A Brief History of the Steering Wheel & Power Steering,” available at: <https://www.brakeandfrontend.com/a-brief-history-of-the-steering-wheel-power-steering/>. Accessed September 6, 2023; Trevor English, “How Automatic Transmissions Overtake Manuals in Speed and Efficiency,” Interesting Engineering, January 30, 2020, available at: <https://interestingengineering.com/transportation/how-automatic-transmissions-overtake-manuals-in-speed-and-efficiency>.

<sup>773</sup> See David S. Evans and Michael Salinger, “Why do Firms Bundle and Tie? Evidence from Competitive Markets and Implications for Tying Law,” *Yale Journal on Regulation*, Vol. 22, No. 5, 2005, pp. 37-89, at p. 40, fn. 13. (“A recent report on bundling and tying by Barry Nalebuff, a leading contributor to the literature, is but one example of how economists put efficiency explanations to one side. ‘Perhaps the most obvious reason to bundle two products is that this leads to a cost saving or quality improvement or both.’ He elaborates on efficiencies for nearly three pages, part of which considers and ultimately rejects the possibility that efficiencies are harmful. He then devotes nearly thirty pages explaining ten additional reasons for bundling and tying that are not related to efficiencies.”). Other benefits noted in the literature include reducing pricing inefficiencies, reducing double marginalization, customer convenience, lower transaction costs, reducing production costs. See Ahlborn, Christian, David S. Evans, and A. Jorge Padilla, “The antitrust economics of tying: a farewell to per se illegality,” *The Antitrust Bulletin*, Vol. 49, No. 1-2, 2004, pp. 287-341, at p. 288 and fn. 133. (“Tying may result in lower production costs. It may also reduce transaction and information costs for consumers and provide them with increased convenience and variety,” “Even if both markets are monopolized, welfare could still be enhanced through elimination of the double marginalization problem or through price discrimination. The critical observation here is that consumers can benefit even when tying and bundling are conducted by a firm with market power.”).

<sup>774</sup> It can be expensive to assure compatibility with a wide range of third-party vendors, and it can impose significant information costs on consumers to assure compatibility. See Jean Tirole, “The Analysis of Tying Cases: A Primer,” *Competition Policy International*, Vol. 1, 2005, pp. 1-25, at p. 15.



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therefore is one way to eliminate welfare-reducing externalities from third parties. Indeed, “casual empiricism suggests that efficiencies must be the major explanation for tying: tying is common in competitive markets and therefore cannot result mainly from foreclosure or from price discrimination.”<sup>775</sup>

448) While tying is often procompetitive,<sup>776</sup> economic theory indicates that some tying arrangements can be anticompetitive. Professor Gans’ tying theory is based on a simple model that ignores procompetitive reasons for tying and assumes that Google has the ability to leverage monopoly power over ad exchanges into ad servers by tying DFP to AdX.<sup>777</sup> This is not the case.

449) Anticompetitive foreclosure arises when the higher prices (or lower quality) for the tied product (DFP under Professor Gans’ theory) stem from depriving rivals of a critical mass of customers for reasons unrelated to procompetitive benefits of the tie (e.g., higher quality due to thicker transactions markets, improved functionality/compatibility, reductions in externalities or productions costs, and benefits of integration). Professor Gans provides no evidence of higher prices or lower quality for DFP. Instead, what we see is considerable evidence that Google’s deeper integration of its ad tech stack resulted in innovation and higher quality, coupled with flat or declining prices.

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<sup>775</sup> David S. Evans and Michael Salinger, “Why Do Firms Bundle and Tie? Evidence from Competitive Markets and Implications for Tying Law,” *Yale Journal on Regulation*, Vol. 22, No. 1, 2005, pp. 37-90, at p. 40.

<sup>776</sup> As Nobel laureate Jean Tirole explains, “ties are likely to enhance consumer welfare when they reduce distribution costs, lower the cost of ensuring compatibility, enhance accountability if a product malfunctions, are necessary to protect intellectual property, and are competitive responses” to the evolution of customer preferences and products offered by rivals. (Jean Tirole, “The Analysis of Tying Cases: A Primer,” *Competition Policy International*, Vol. 1, No. 1, 2005, pp. 1-25, at p. 3).

<sup>777</sup> Notably, while Professor Gans cites Jean Tirole’s article on tying (Gans Report, at ¶411, fn. 486), which argues that tying should be analyzed under rule of reason even by a dominant firm, his assessment of Google’s conduct ignores procompetitive justifications.

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450) Professor Gans claims that an increase in DFP's market share is evidence of "[t]he foreclosure impact of the tie."<sup>778</sup> As I have already explained, this is incorrect. One would expect pro-competitive quality improvements and thicker markets to result in higher demand for Google's products because more advertisers and publishers prefer Google to its rivals. As a result, regardless of whether a tie is procompetitive or anticompetitive, one would observe an increase in Google's share. To establish that a tie was anticompetitive, one must examine metrics that provide relevant economic information about competition in a market, such as prices,<sup>779</sup> output, and quality. To the extent that one considers the impact of an alleged tie on exit of competitors or barriers to entry, one must determine whether these stemmed from anticompetitive foreclosure or other reasons (e.g., rivals losing customers as a result of security breaches or customers choosing Google because it offers higher quality). To the extent Google's rivals were unable to compete because Google made its products better in terms of quality or price, this would not be anticompetitive but instead is exactly the type of procompetitive conduct that benefits customers.

**B. Professor Gans Fails to Provide Any Reliable Economic Data to Support his Conclusion that Google Engaged in Anticompetitive Tying**

451) Professor Gans provides no relevant economic data to support his conclusion that Google anticompetitively tied use of its ad server (DFP) to the use of its ad exchange (AdX).<sup>780</sup> He conducts no

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<sup>778</sup> See Gans Report, at ¶449.

<sup>779</sup> While one might generally expect benefits from procompetitive tying to lead to lower prices, this need not be the case. For example, if tying results in greater customer convenience or quality improvements, prices may rise because customers find the improved attributes of the tied product more valuable. For this reason, one must be cautious in interpreting nominal price increases as evidence of anticompetitive foreclosure. Accounting for customer convenience and/or quality improvements, higher nominal prices may translate into lower (quality-adjusted) prices.

<sup>780</sup> Professor Gans characterizes the alleged tie as follows: "if [publishers] wanted to access [AdX] demand, they needed to use Google's ad server, DFP" and "conditioning the sale of [AdX] on the sale of [DFP]." (Gans Report, at ¶¶407-408).

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data analysis demonstrating that the alleged tie reduced output, raised prices above competitive levels, or reduced quality. Professor Gans also fails to provide data analysis that would demonstrate that the alleged tie prevented rivals from achieving minimum efficient scale, drove them out of business, or otherwise reduced the number of competitors. Without such data analysis it is impossible to determine reliably whether the alleged tie was more likely procompetitive—as most such ties are—or had anticompetitive effects on customers.<sup>781</sup>

452) Professor Gans’ data analysis is limited to his Figure 12, which he interprets as showing that Google’s publisher ad server share increased over time.<sup>782</sup> However, Professor Gans does not provide economic analysis to link this increase in share to the to the alleged tie<sup>783</sup> and completely ignores that improvements to Google’s ad tech stack benefiting customers and content viewers—such as higher quality, improved security, new features, and its exchange and ad server working together more efficiently—also would cause Google’s share to increase. In fact, Professor Gans’ Figure 12 shows that during the time of the alleged tie, publishers benefited significantly from growing revenue through

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<sup>781</sup> See Erik Hovenkamp, and Herbert Hovenkamp, “Tying Arrangements and Antitrust Harm.” *Arizona Law Review* Vol. 52, 2010, pp. 925-976, at p.927. (“The great majority of ties are beneficial or at least benign, measured by either welfare standard, and this is true without even considering production efficiencies that many ties produce.”).

<sup>782</sup> Gans Report, at ¶454, Figure 12. (“The graph displays a clear trend of declining use of AdX direct tags. This means that over time, less AdX revenue has come from outside of Google’s publisher ad server.”). Professor Gans uses transactions conducted on AdX alone as a proxy for Google’s share in his candidate publisher ad server market. I note that improvements by Google that benefited publishers, advertisers, and users would increase transactions conducted on AdX (as suggested in his figure) that did not come at the expense of rivals.

<sup>783</sup> In fact, Professor Gans does not even state that the figure demonstrates anticompetitive foreclosure.

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AdX.<sup>784</sup> In my opinion, such revenue growth benefiting publishers is inconsistent with finding that Google's alleged tie was anticompetitive.<sup>785</sup>

453) Professor Gans also ignores that a multi-sided platform has many, heterogeneous stakeholders. To reliably determine whether an alleged tie is anticompetitive, one must examine the business practice holistically to account for externalities and indirect network effects across the entire ad tech stack. As two prominent economists explain:

“[A] two-sided platform may impose requirements on side A that do not benefit them directly and which customers on that side might even reject after comparing private benefits and costs. But such requirements may benefit side B. And if the demand increases on side B, these requirements may increase the value placed on the platform on side A-- and in fact could increase value so much that the feature provides a net benefit to side A.”<sup>786</sup>

454) Professor Gans does not consider indirect network effects or externalities, and ignores this economic literature indicating the procompetitive effects arising from deeper integration, such as that of AdX and DFP. In fact, the following quote from a Google document that Professor Gans uses to support his conclusion indicates that Google's integration of AdX and DFP sought to optimize publishers' experiences:

“That [own the tag] strategy has served us well for a long time because it means we control the decision logic and we can ensure *all the incredible work our engineers put into making our ad server and exchange work together makes the best decision on behalf of our pubs...* The fact that AdX demand could bid and win in real-time against our tag-

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<sup>784</sup> Gans Report, at ¶454, Figure 12.

<sup>785</sup> According to Professor Gans, “Figure 12 [...] depicts the trend over time for AdX gross revenue originating from DFP (GPT Tag) versus from third-party ad servers (AdX Direct Tag). This means that over time, less AdX revenue has come from outside of Google's publisher ad server.” (Gans Report, at ¶454). Even accepting Professor Gans' calculations and narrow candidate markets as correct, these data indicate that total output increased. This is inconsistent with anticompetitive foreclosure.

<sup>786</sup> David S. Evans and Richard Schmalensee, “The Industrial Organization of Markets with Two-Sided Platforms,” *Competition Policy International*, Vol. 3, No. 1, 2007, pp. 151-179, at pp. 177-178.

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based indirect competition and ultimately against directly sold ads was key to establishing ourselves as a preferred holistic yield management partner to a great many pubs across the globe.”<sup>787</sup>

455) Professor Gans’ own conclusions concerning the alleged tie are contradicted by the documents he uses. For example, the document he utilizes for his 2015 ad server market share states that publishers turned to DFP “because they have needed a way to serve direct, guaranteed campaigns via non-RTB protocol, because direct campaigns make up majority of their advertising revenue.”<sup>788</sup> Indeed, the 2015 email chain contained in that document is an internal discussion of business people arguing that Google should increase investment in DFP (“modernizing the ad server”) and that “the modern publisher ad server needs to allow as many demand sources as the publisher wants to compete in real time for a given impression, while following whatever rules and contractual agreements between buyer and seller have been established.”<sup>789</sup> I note that Google’s subsequent launch of Exchange Bidding Dynamic Allocation in 2017 (now Open Bidding) did just that: it permitted publishers to choose the ad exchanges they wished to compete in real-time auctions-of-auctions, while providing publishers with the technical means to meet the contractual obligations of their deals with advertisers.<sup>790</sup>

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<sup>787</sup> Gans Report, at ¶433 (emphasis added) (quoting GOOG-NE-04442479, at -483; -493). I emphasize that this document also indicates that the strategy was procompetitive because it allowed AdX demand to compete in auctions.

<sup>788</sup> GOOG-TEX-00089241-45, at -42.

<sup>789</sup> GOOG-TEX-00089241-45, at -43.

<sup>790</sup> Google Ad Manager Help, “Ad competition with dynamic allocation,” available at: <https://support.google.com/admanager/answer/3721872>, Accessed April 1, 2024. (“Dynamic allocation allows all non-guaranteed demand—Open Auction, Open Bidding, and remnant line items—to compete in real time with guaranteed demand. Competition occurs on an impression-by-impression basis and does not compromise delivery or revenue of guaranteed demand.”); *See also* Google Ad Manager Help, “How Open Bidding works,” available at: <https://support.google.com/admanager/answer/7128958>. Accessed July 29, 2024 (“Open Bidding requests are handled by Ad Manager via a “server-to-server” integration between publishers and their demand partners. Once an ad request is generated, Ad Manager hosts a unified auction, comparing yield partner bids, the Ad Exchange bid and other direct line items via dynamic allocation to ensure that each impression maximizes yield.”).

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**C. The Evidence is Inconsistent with Professor Gans' Conclusion that Google Tied the Use of Its Publisher Ad Server to the Use of Its Ad Exchange**

456) Professor Gans argues that publishers could only use AdX if they also agreed to use DFP (i.e., that Google tied DFP to AdX).<sup>791</sup> He further claims that Google was able to impose this purported tie by limiting access to Google Ads demand to publishers using AdX.<sup>792</sup> Contrary to Professor Gans' narrative, there is no evidence that publishers were forced to use DFP. Publishers had multiple ways other than through DFP to access AdX and bids from Google Ads. Google developed several technological means for publishers to access its ad exchange and Google Ads, including publisher tags, AdX Direct, and Project Yavin.<sup>793</sup> Additionally, and as noted earlier, there is evidence that a significant number of Google Ads advertisers multi-home on non-Google buying tools, meaning their demand is available on non-AdX exchanges.<sup>794</sup> I discuss these and other features of data and the record that are inconsistent with Professor Gans' conclusions.

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<sup>791</sup> Gans Report, at ¶414 (“Here, Google tied its AdX ad exchange with its DFP ad server. These are independent products with separate demand for each product. Google conditioned the use of AdX (the tying product) with the sale of its DFP ad server (the tied product).”).

<sup>792</sup> Gans Report, at ¶415 (“Google’s tying conduct involved three of its AdTech tools at different time periods: Google’s ad server (DFP), Google’s ad exchange (AdX), and Google’s ad-buying tool for small advertisers (AdWords, later Google Ads).”); Gans Report, at ¶416(b) (“Around the same time, Google limited its ad-buying tool for small advertisers to Google’s ad exchange (AdX), making Google Ads demand exclusive to AdX amongst exchanges, and leading publishers to consider AdX a “must-have” exchange.”).

<sup>793</sup> Professor Gans acknowledges these options in his report. (See Gans Report, at ¶353, fn. 379, ¶429). Google started developing Project Yavin (also known as “Ad Connector”) in June 2017, with the goal of targeting publishers that used a “[p]roprietary ad server” and thus, were unlikely to consider using Google’s ad server (GOOG-DOJ-03634896, at -908; GOOG-DOJ-13233139, at -142). Examples of publishers who participated in the Project Yavin are eBay, LinkedIn, and Snapchat (GOOG-DOJ-AT-02321586; GOOG-DOJ-AT-02324779; and GOOG-DOJ-AT-02225544). AdX Direct refers to pieces of code (also known as “tags”) that publishers can place on their websites, allowing them to request demand from AdX even if they don’t use DFP (Google, “Generate Ad Exchange ad tags,” available at: <https://support.google.com/admanager/answer/7501422>. Accessed July 26, 2024). See also GOOG-AT-MDL-C-000017381, at -382 (“Ad Connector (internally also known as ‘Yavin’) is a service that allows Google Ads and DV360 to bid into ad auctions conducted on publishers’ proprietary ad servers. Because Ad Connector requires custom integrations between Google and each customer’s ad server, it was offered to customers on a one-off basis based on Google’s available integration resources.”); GOOG-DOJ-AT-02160057, at -063 (noting that Ad Connector works by directly integrating Google Ads and DV360 into the auction run inside the publisher’s ad server, whereby they compete in real time with demand from third-party exchanges).

<sup>794</sup> Deposition of George Levitte (Google) on August 10, 2021, (hereafter “Levitte (Google) Deposition”), at 37:1-3. I note that Figure 137 shows that a non-trivial amount of Google Ads advertisers transact on non-AdX exchanges.

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457) Together, Professor Gans “characterize[s] these actions as a tying strategy pursued by Google to tie its ad server, DFP, to its exchange, AdX.”<sup>795</sup> However, because I show that each of these actions<sup>796</sup> individually is not anticompetitive, the overall effect also does not amount to an anticompetitive “strategy.”<sup>797</sup> That is, the whole is not bigger than the sum of its parts—Professor Gans has not demonstrated any way in which the aggregation of benign conduct can produce an anticompetitive outcome.

***1. Integration of the Ad Tech Stack Is Not an Anticompetitive “Tie”***

458) Professor Gans defines an anticompetitive tie as one in which a firm has “enough monopoly power [in one relevant product market, ad exchanges,] to force buyers to alter their decisions to [buy] a specific product in a more competitive market [publisher ad servers].”<sup>798</sup> However, Professor Gans does not provide evidence or analysis suggesting publishers were “forced” to use DFP. Instead, Professor Gans confuses beneficial improvements in the interoperability of AdX and DFP with an anticompetitive

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<sup>795</sup> Gans Report, at ¶408. (“I first examine tying which is one in a series of choices and actions on the part of Google that steered advertiser demand into Google’s own exchange. The tie put publishers in a position that if they wanted to access that demand, they needed to use Google’s ad server, DFP. For Google to do this, I first explain how Google established its monopoly power in the exchange market by limiting demand from a large set of advertisers to Google’s own exchange. Then, I explain how Google foreclosed publishers using third-party ad servers from selling to Google’s exchange. Google effectuated these limitations through code on publishers’ websites. In 2016, Google then imposed a contractual tie between its exchange and its publisher ad server.”).

<sup>796</sup> According to Professor Gans, these actions are: (1) “limiting demand from a large set of advertisers to Google’s own exchange”, (2) “foreclose[ing] publishers using third-party ad servers from selling to Google’s exchange”, 3) “contractual tie between its exchange and its publisher ad server”. (Gans Report, at ¶408.).

<sup>797</sup> Professor Gans’ tying theory does not make economic sense because his analysis does not find his candidate ad server market to be “a more competitive market.” According to Professor Gans, Google’s market share in his candidate ad server market is almost twice as large as its market shares in his candidate ad exchange and buying tools for small advertisers markets. In particular: (1) DFP’s market share was █████ in 2018 and 2019 (Gans Report, at ¶353), (2) AdX’s market share ranged between █████ and █████ percent from 2018 to 2021 (Gans Report, at Table 5), (3) Google Ads’ market share ranged between █████ and █████ percent from 2018 to 2021 (Gans Report, at Table 7).

<sup>798</sup> Gans Report, at ¶412.

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tie. More specifically, Professor Gans appears to view the evolution of features<sup>799</sup> and deeper integration<sup>800</sup> of Google's ad tech stack as an anticompetitive tie. Professor Gans also indicates that an anticompetitive tie "might arise in the form of higher prices, lower innovation and entry deterrence,"<sup>801</sup> but conducts no data analysis to demonstrate that prices, innovation, or numbers of rivals were diminished.<sup>802</sup>

459) My analyses in Section VIII.B.4 provide strong evidence that Google's deeper integration of its ad tech stack (i.e., integration of Google Ads, AdX, and DFP) benefited advertisers, publishers, and users. Among other things, Professor Gans fails to account for the fact that, even in the absence of any cost savings or other efficiencies,<sup>803</sup> ad serving fees (i.e., prices in his "tied" market) are lower after Google's integration of its ad tech stack. In this context, it is wrong to view Google's deeper integration of AdX and DFP as an anticompetitive tie.

460) For example, under Professor Gans' theory, a dating platform (e.g., Match.com) is engaged in an anticompetitive tie if it doesn't allow users of a competing dating platform (e.g., eHarmony) to access its users' profiles, or if a ride sharing platform (e.g., Uber) doesn't give drivers using a competing platform (e.g., Lyft) access to customers using its app. Viewed in this way, Professor Gans' theory

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<sup>799</sup> Professor Gans describes "automatically enroll[ing] Google Ads' search advertisers into buying display advertising via the same tool" as the beginning of an alleged tie. (Gans Report, at ¶¶418-419). Google merely expanded the set of ad types that advertisers can purchase using Google Ads. As a matter of economics, this is plainly beneficial to advertisers because it increases their available choices.

<sup>800</sup> Professor Gans describes Google "[making] its ad-buying tool exclusive to AdX" and "combin[ing] DFP and AdX into a single offering" as part of his tying discussion. (Gans Report, at ¶¶420-422, 444-448). As discussed in Section VIII.B, integration leads to greater investments and lower prices than would prevail in the absence of integration, other things equal.

<sup>801</sup> Gans Report, at ¶412.

<sup>802</sup> Gans Report, at ¶412.

<sup>803</sup> As discussed in Section VIII.B, integration changes economic incentives and constraints that lower prices even in the absence of efficiencies or cost savings.



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appears to suggest that a matching platform that is not fully open to rivals engages in tying one side of its platform to the other. As a matter of economics, such an approach would likely chill procompetitive conduct, as it would appear to transform the procompetitive benefits of integration described in Section VIII—and the efficient matching of buyers and sellers—into a potential antitrust violation.

461) Were Google unable to protect its investments,<sup>804</sup> or otherwise forced to ignore complementarities between DFP and other elements of its ad tech stack, data and economic theory indicate that many publishers—and nearly all small publishers—would face higher stand-alone ad server fees. This would harm users because publishers would have less money to invest in content, and so users would see lower-quality input due to the higher publisher ad serving fees. In the present context, Google’s low fees for DFP—even for larger publishers using direct deals that bypass AdX entirely—induce a richer supply of available impressions for advertisers using Google’s buy-side tools (Google Ads and DV360), some of which bid into AdX, contributing to a healthy ecosystem for advertising on internet that better competes with walled gardens.<sup>805</sup> In short, Professor Gans’ notion of a tie ignores all of these considerations stemming from integration and indirect network effects.

## ***2. Publishers Could and Did Access Google’s Ad Exchange Without DFP***

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<sup>804</sup> Publishers who use DFP at the subsidized price to sell inventory outside of Google’s ecosystem opportunistically exploit Google’s investments in DFP that make the tool so attractive. In an internal strategy document from 2018, Google notes that they “offer a lot of flexibility in [its] [Ad Manager] product, which many publishers leverage to get a free product. [REDACTED] of [Google’s] active [GAM] publishers don’t use AdX or AdSense. Most of these publishers are in the free tier of [Google’s] [Ad Manager] product, meaning they get an entirely free product. When [Google] think[s] about [its] costs for computing resources, serviceability, sales, and product / eng[ineering] support, these publishers represent a significant tax on [Google’s] business.” (GOOG-DOJ-13218256, at -256).

<sup>805</sup> GOOG-DOJ-04004392, at -398. (“[T]he most important reason the Sellside exists is to bring quality, fair (preferable if possible) reach to our demand. There is definitely truth to the belief that we help a lot of sites/apps stay in business and that in return helps keep the web and apps ecosystem open[.]”).

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462) My review of the relevant documents leads me to conclude that publishers using third-party ad servers have had, and continue to have, access to AdX demand as well as access to advertising dollars spent by advertisers that use Google Ads through a variety of means. This is inconsistent with Professor Gans' claim that Google restricted the ability of publishers using a non-Google ad server to trade through Google's exchange—whether by restricting publishers using third-party ad servers from receiving live, competitive bids from its exchange,<sup>806</sup> limiting those publishers' access to purportedly “unique” Google Ads demand in Google's ad exchange, or otherwise.

463) As an initial matter, Professor Gans himself recognizes that some publishers who use AdX do not need to use DFP to access it.<sup>807</sup> Moreover, [REDACTED] percent of publishers using DFP do not use AdX.<sup>808</sup> These data are inconsistent with Professor Gans' notion that access to Google Ads through AdX drives publishers to adopt DFP.

464) Data indicate that the share of AdX publishers in a given month that use AdX Direct—which allows publishers to query AdX regardless of DFP usage<sup>809</sup>—exclusively or in combination with DFP is significant, averaging [REDACTED] percent and [REDACTED] percent, respectively, over the sample period (June 2013 to March 2023).<sup>810</sup> More specifically, the data reveal that over this period, the share of publishers

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<sup>806</sup> See Gans Report, at ¶457, 407. (“[P]ublishers seeking to sell inventory to [Google Ads] advertisers must use AdX.” “The tie put publishers in a position that if they wanted to access [Google Ads] demand, they needed to use Google's ad server, DFP.”).

<sup>807</sup> See Gans Report, at Figure 12.

<sup>808</sup> See Exhibit 27. See also Figure 138, showing that there are 49,805 publishers in Professor Gans' candidate market not using AdX, compared to 15,173 publishers using AdX.

<sup>809</sup> I note that whether the publishers who use AdX Direct also have DRX/GAM contracts or not is irrelevant. These publishers are still exercising an option that would allow them to leverage a third-party ad server with no loss of functionality compared to their current setup, if they chose to do so. The fact that they do (or do not) choose to use GAM alongside AdX Direct is an indicator of their preference for Google's offerings, not evidence of a tie.

<sup>810</sup> See Figure 139 and Figure 140

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who (1) exclusively use AdX Direct to access AdX, or (2) use a mix of AdX Direct and DFP to access AdX never fell below █████ percent from 2013 to 2018 (two years after the alleged tie occurred), and never fell below █████ percent prior to November 2022.<sup>811</sup> As a threshold matter, that such a large number of publishers are able to sell impressions on AdX without using DFP is inconsistent with Professor Gans' assertion that publishers were compelled to adopt DFP to gain access to AdX demand. That is, the data are inconsistent with there being a tie as Professor Gans claims.<sup>812</sup>

**3. Publishers Could and Did Access Google Ads Demand Without DFP**

465) The data are also inconsistent with Professor Gans' claim that "unique" Google Ads demand rendered AdX a "must have," accessible only to publishers using DFP.<sup>813</sup> Before exploring the ways in which Google Ads advertisers' dollars are available through alternate channels, I note that Google's choice to have Google Ads bid primarily into AdX is not a unique arrangement in ad tech. Other ad tech companies also reserve certain demand as exclusive to their ad exchange solutions as a means of attracting more demand from publishers. Google even notes that Amazon and Facebook offer "robust and unique demand to rival [Google Ads]."<sup>814</sup> YieldLove, a header bidding exchange that frequently purchases inventory from publishers states that its publishers "[b]enefit from exclusive access to Ströer

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<sup>811</sup> See Figure 140.

<sup>812</sup> Professor Gans states that "Google foreclosed publishers using third-party ad servers from selling to Google's exchange." (Gans Report at ¶407). The fact that publishers accessing AdX through means other than DFP are not receiving exactly the same interface as publishers accessing AdX through DFP is due to more efficient technical integration between these parts of Google's ad tech stack, as discussed in Section VIII.B. That a publisher must use the integrated components to receive the benefits of integration is not a tie, but an artifact of the intrinsic benefits from combining complements discussed in Section VIII.A.

<sup>813</sup> Professor Gans asserts that "[a]round the same time, Google limited its ad-buying tool for small advertisers to Google's ad exchange (AdX), making Google Ads demand exclusive to AdX amongst exchanges, and leading publishers to consider AdX a "must-have" exchange." Further, Professor Gans alleges that "[s]tarting in 2016, Google contractually tied its ad exchange (AdX) and its publisher ad server (DFP), meaning that publishers wanting to access AdX demand in any form (in real-time or otherwise) were forced to sign a combined DFP-AdX contract. (Gans Report, at ¶416(b); ¶416(d)).

<sup>814</sup> GOOG-DOJ-13952875, at -878. In the same internal slide deck, Google also notes that "Google has strongest total offering for publishers but [Facebook] and Amazon are gaining ground." (GOOG-DOJ-13952875, at -883).

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SSP, the largest Private Marketplace in Europe.”<sup>815</sup> Nonetheless, I address Professor Gans’ assertions regarding Google Ads below.

466) One way that publishers—whether they use DFP or not—can access bids from Google Ads is outside of AdX. A large number of Google Ads advertisers multi-home, using demand-side products in addition to Google Ads, which I have discussed in greater detail in Section VII.<sup>816</sup> It is clear that publishers can reach a large portion of Google Ads demand through other exchanges. The documents I have reviewed are inconsistent with Professor Gans’ assertions that Google required publishers to license Google’s ad server to access Google Ads demand.<sup>817</sup>

467) Documents and publicly available information show that Google has several tools that allow publishers to use third-party ad servers and still reach advertisers using Google Ads. First, GAM allows publishers to work in conjunction with third-party ad servers through AdX Direct tags to access AdX demand (i.e., winning bids from a real-time auction on AdX).<sup>818</sup> Second, Google developed AwBid, which enables Google Ads to bid into third-party exchanges.<sup>819</sup> The amount transacted monthly by U.S

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<sup>815</sup> Yieldlove, “Empowering Publishers,” available at: <https://www.yieldlove.com/en-gb/demand/>. Accessed April 26, 2024.

<sup>816</sup> As a 2021 Advertiser Perceptions report found, for advertisers that spent more than [REDACTED] annually on digital ads, an average of [REDACTED] DSPs were used and this number was expected to rise to [REDACTED] by the next year. When looking at advertiser spending upwards of [REDACTED] annually, the average number of DSPs they planned to use rises to [REDACTED] (GOOG-AT-MDL-001483428, at -433). *See also* [REDACTED] (Google) Deposition, at 37:1-3. I note that Figure 137 shows that a non-trivial amount of Google Ads ad spend is transacted on non-AdX exchanges.

<sup>817</sup> Gans Report, at ¶407. (“The tie put publishers in a position that if they wanted to access [advertiser] demand, they needed to use Google’s ad server, DFP.”).

<sup>818</sup> Google, “Generate ad tags,” available at: <https://support.google.com/admanager/answer/177207>. Accessed October 25, 2022; GOOG-DOJ-13564585, at -586. (“Pub[lisher]s trafficking AdX tags directly on webpage and pub[lisher]s trafficking AdX tags in third party ad servers are NOT affected [by the DRX AdSlot depreciation, a DRX Unification project,] and no actions needed for them.”).

<sup>819</sup> GOOG-TEX-00927226, at -227. (“Through AwBid, buyers in AdWords will have access to Yahoo! owned and operated content, Windows Live and Hotmail content (via AppNexus) as well as inventory available on many third party ad exchanges such as AdMeld, PubMatic, Rubicon and adBrite.”). *See also* GOOG-DOJ-13587570, at cell F142 (showing that AwBid launched in June 2015 exclusively for Google Ads advertisers running remarketing campaigns.); GOOG-DOJ-13615208, at -218 (noting that “[r]emarketing is

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advertisers on Google Ads through third-party exchanges is significant, having grown from [REDACTED] in June 2016 (when Professor Gans asserts that Google put in place a “contractual tie”) to [REDACTED] in January 2023.<sup>820</sup> In fact, since June 2016, approximately [REDACTED] in ad spend has gone through third-party exchanges. These patterns provide further evidence that non-Google exchanges can access Google Ads demand. Third, Google Ad Connector (otherwise known as “Yavin,” and previously as “Demand Product”), is another Google product that allows select publishers with in-house ad serving solutions to access bids from Google Ads and DV360 through direct integrations, bypassing AdX altogether.<sup>821</sup>

468) Professor Gans claims that “AWBid had limited impact on AdWords’ exclusivity to AdX, reflecting the limits Google imposed on the program... The limited availability of AdWords demand through third-party exchanges meant that the ‘must-have’ nature of AdX to publishers persisted beyond 2016.”<sup>822</sup> Professor Gans does not appear to have evaluated AwBid or considered whether is a viable alternative demand source to the publishers he says have been harmed by the alleged tie. In fact, as noted above, ad spend on Google Ads for display ads (narrow) purchased from third-party exchanges has

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where Adwords faces the most competitive pressure and most benefit from additional reach. Majority of remarketing advertisers are not budget constrained and want more conversion volume.”); GOOG-DOJ-13600410, at -410 (noting that AwBid was expanded in 2018 to include certain types of non-remarketing demand, with a “buyside expansion to [Interest Category Marketing (ICM)].”); GOOG-DOJ-13609092, at -092 (noting the second launch “for the remaining targeting types (e.g. Keywords, Custom In-Market, Custom Affinity, Demographic, etc.).”).

<sup>820</sup> See Figure 137.

<sup>821</sup> GOOG-AT-MDL-C-000017381, at -382. (“Ad Connector (internally also known as ‘Yavin’) is a service that allows Google Ads and DV360 to bid into ad auctions conducted on publishers’ proprietary ad servers. Because Ad Connector requires custom integrations between Google and each customer’s ad server, it was offered to customers on a one-off basis based on Google’s available integration resources.”). See also GOOG-DOJ-AT-02160057, at -063. (noting that Ad Connector works by directly integrating Google Ads and DV360 into the auction run inside the publisher’s ad server, whereby they compete in real time with demand from third-party exchanges.).

<sup>822</sup> Gans Report, at ¶423.<sup>823</sup> Gans Report, at ¶423. (“The limited availability of AdWords demand through third party exchanges meant that the “must-have” nature of AdX to publishers persisted beyond 2016.”).

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experienced substantial growth during the alleged tie, which undermines Professor Gans' opinion that the availability of Google Ads through third-party exchanges is limited.<sup>823</sup>

469) These findings are inconsistent with Professor Gans' conclusion that Google forced publishers to use DFP as a condition of using AdX.

**4. Access to Real-Time Bids is a Feature, Not a Product**

470) Professor Gans also claims that Google only allowed publishers that license Google's ad server to receive live, competitive bids from its exchange.<sup>824</sup> As a matter of economics, tying occurs when one distinct product is sold only with another distinct product.<sup>825</sup> Having reviewed relevant documents and data, I find that competing publisher ad servers could access live demand from AdX, but were constrained to serving an ad if, once called, AdX identifies a winning bidder in excess of the publisher's floor price.

471) Regardless, Professor Gans has not established that there is a relevant product market for real-time bids. What Professor Gans considers to be the "product" to which DFP is being tied is access to a feature of AdX (access to real-time bids) offered to publishers who license DFP.<sup>826</sup> More

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<sup>823</sup> Gans Report, at ¶423. ("The limited availability of AdWords demand through third party exchanges meant that the "must-have" nature of AdX to publishers persisted beyond 2016.").

<sup>824</sup> Gans Report, at ¶435 ("As early as 2009, Google had technology that allowed third-party ad servers to solicit bids in real-time from AdX in a way that benefited publishers. Google, however, elected not to bring that technology to market."); Gans Report, at ¶¶568-569 ("Google's ad server refused to provide publishers with the ability to solicit simultaneous live bids from multiple exchanges[, but] allowed AdX, and only AdX, to compete in real-time against all non-guaranteed inventory.").

<sup>825</sup> "Tying refers to the behavior of selling one product (the tying product), conditional on the purchase of another product (the tied product)." (Jean Tirole, "The Analysis of Tying Cases: A Primer," *Competition Policy International*, Vol. 1, 2005, pp. 1-25, at p. 8).

<sup>826</sup> Gans Report, at ¶422 ("This transformed AdX into a 'must-have' exchange. [...] According to Brian O'Kelley, the publisher rationale for AdWords being a 'must-have' is that 'with Google having a unique demand source, switching away from AdX or switching away from DFP would mean losing one of the largest demand sources, if not the largest demand source, and, therefore, would have

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specifically, Professor Gans claims that non-DFP publishers were relegated to receiving static bids from AdX.<sup>827</sup> Professor Gans ignores that healthy non-price competition routinely involves firms enhancing features of existing products. Viewing the evolution of the features of a product as an anticompetitive tie would chill innovation and stifle non-price competition.

472) What Professor Gans claims is a tie not actually a tie of one product to another (i.e., DFP to AdX), but rather a choice by Google to provide certain functionality of AdX (i.e., real-time bids) only to publishers using its integrated server, DFP. Viewed in this context, there is nothing unusual about a feature of an integrated firm's product working more efficiently with its own complementary products than with third-party products. Indeed, one would expect to observe this given the incentives of an integrated multi-sided platform discussed in Section IX. Real-time bidding comes with data processing and transmission requirements—that is, costs. This feature requires building pipelines that get publisher data (e.g., characteristics of a current visitor) to an advertiser quick enough to submit a real-time bid. Professor Gans does not consider that providing this feature exclusively through DFP might be simpler, cheaper, and impose lower latency costs.

**5. Google's DRX Contracts Do Not Force Publishers to Use DFP**

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significant monetization implications, or cost you a lot of money, or could, if you left.”); Gans Report, at ¶457; 407 (“[P]ublishers seeking to sell inventory to [Google Ads] advertisers must use AdX.” “The tie put publishers in a position that if they wanted to access [Google Ads] demand, they needed to use Google’s ad server, DFP.”). See Gans Report, at ¶¶568-569 (“Google’s ad server refused to provide publishers with the ability to solicit simultaneous live bids from multiple exchanges[, but] allowed AdX, and only AdX, to compete in real-time.”).

<sup>827</sup> Gans Report, at ¶416(c). (“Starting in 2009, Google imposed technical limitations preventing publishers using third-party publisher ad servers from selling to Google’s ad exchange (AdX) in real-time open auctions.”).

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473) Professor Gans ignores documents indicating that the business rationale for Google's DRX contracts<sup>828</sup> was to "[e]nable all AdX and/or DFP publishers to use [a] unified product, which contains fully integrated AdX and DFP functionalities on a single platform with the least complexity."<sup>829</sup> He provides no evidence that signing a DRX contract prevented AdX publishers from using third-party ad servers, or forced them to use DFP.<sup>830</sup> Prior to DRX contracts, documents indicate that Google provided publishers with two separate systems for AdX and DFP and required customers to sign a separate contract for each system.<sup>831</sup> After the integration of AdX and DFP into GAM, publishers could manage their inventory with one system and sign a single contract. As a matter of economics, this change did not reduce publishers' choices; it improved functionality by providing more seamless management of inventory,<sup>832</sup> reduced the transaction costs of signing multiple contracts,<sup>833</sup> and allowed Google to manage a unified user interface rather than maintaining multiple interfaces.<sup>834</sup> Economic theory

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<sup>828</sup> GOOG-DOJ-AT-01128809, at -809 ("The Unified DIP/AdX Contract is the default contract (since June 2016) for both DFP (SB or Premium) and AdX. It is sometimes referred to as a DRX Contract.").

<sup>829</sup> GOOG-TEX-00036237, at -239. Professor Gans also ignores that the value proposition was to "[b]ring AdX and DFP together for publishers to seamlessly transact via any sales channel across all platform types with full transparency and control [ and e]nsure DFP is the must-call programmatic platform for large publishers to access all demand from auctions and deals, as a unified product." (GOOG-TEX-00036237, at -239). Professor Gans appears to interpret the value proposition of creating a "must-call programmatic platform" as inherently exclusionary. (See Gans Report, at ¶448). As a matter of economics, one could also interpret this language to reflect the strategy to offer the very best platform such that publishers prefer Google to its rivals on the merits of its offering.

<sup>830</sup> To the contrary, [REDACTED] 30(b)(6) deposition testimony clarifies that ad serving and ad exchange capabilities within GAM "are distinct features in a single platform." (Deposition of [REDACTED] (Google) on April 12, 2024, (hereafter "[REDACTED] (Google) Deposition"), at 139:3-19). Whether or not those distinct features are each utilized, however, is not a prerequisite to signing up for access to the unified platform.

<sup>831</sup> GOOG-DOJ-AT-01128809, at -826, -828 (An internal Google presentation titled "DRX\* Contracting Guide" states that "Legacy DFP contracts cannot be created since summer 2016, following the move to new unified contracts." The presentation also states that "Legacy AdX Contracts are standalone AdX contracts that were used from 2011-2016.").

<sup>832</sup> GOOG-TEX-00348289, at -487 (In an internal presentation, Google describes the "need to have a seamless, intuitive workflow that allows publishers to transact in the most efficient way possible, while providing as much insight and data as possible" and that this "is not possible" "[w]ith a fragmented inventory setup across DFP and AdX.").

<sup>833</sup> GOOG-TEX-00348289, at -488 (In an internal presentation Google lists several benefits of unification, these include that a "[s]ingle, efficient UI means more time can be spent on the thing that matter.").

<sup>834</sup> GOOG-TEX-00348289, at -487 (noting that a single UI's "[e]nhanced visibility [will help with] troubleshooting serving issues related to blocking, deals, etc.").



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demonstrates that contracts typically reduce transaction costs and often have other efficiency-enhancing features (such as preventing underinvestment in specialized assets, reducing bargaining costs, and mitigating hold-up problems and free-riding).<sup>835</sup>

474) Professor Gans' conclusion that "[t]he effect of the contractual tie disadvantaged rivals of DFP because they no longer had access to AdX, which had unique Google Ads demand"<sup>836</sup> is misleading. First, Professor Gans has not identified language in DRX contracts that prevents rival ad servers from calling AdX demand. Indeed, his report indicates that DRX contracts are not an economic tie because publishers could and did access AdX from third parties long after 2016, the date he indicates Google required publishers to use DFP as a precondition for using AdX.<sup>837</sup> Second, as I demonstrated earlier, Google Ads advertisers used a plethora of other avenues to purchase ad inventory, and publishers could access those advertisers' demand through those other avenues.

475) Further, the combined contracts do not specify prices that are any different from the separate contracts, indicating that Google was not attempting to leverage its position with AdX to bolster its own profits.<sup>838</sup>

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<sup>835</sup> Michael R. Baye and Jeffrey Prince, *Managerial Economics and Business Strategy*, Edition 10, McGraw Hill, 2022, at pp. 187-188.

<sup>836</sup> Gans Report, at ¶449.

<sup>837</sup> In fact, publishers can access AdX demand through third-party ad servers, as Professor Gans appears to acknowledge at Gans Report, at ¶454 ("Figure 12 below depicts the trend over time for AdX gross revenue originating from DFP (GPT Tag) versus from third-party ad servers (AdX Direct Tag)" which shows AdX Direct Tag revenue years after his 2016 date for the "Contractual Tie.").

<sup>838</sup> "The standard revenue share (revshare) for legacy AdX contracts is the same as the standard revshare for unified DFP/AdX contracts." (GOOG-DOJ-AT-01128809, at -828).

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**D. The Evidence is Consistent with Google's Conduct Being Procompetitive and Inconsistent with it Having Harmed Ad Server or Ad Exchange Customers.**

476) The data and documentary evidence are inconsistent with Professor Gans' conclusion that the alleged tie foreclosed rival publisher ad servers and harmed customers. For a tie to harm competition, it must reduce total market output and increase prices.<sup>839</sup> Professor Gans offers no evidence of output declining or prices increasing as a result of the alleged tie. In this section, I will show that the data are consistent with Google's integration strategy being procompetitive and inconsistent with Professor Gans' assertion that its tying conduct resulted in anticompetitive foreclosure of rival ad servers that harmed publishers.

477) First, I examine the data and conclude there is no reliable evidence to support Professor Gans' conclusion that the alleged tie resulted in anticompetitive harm to publishers. In particular, I find that the alleged tie did not increase ad server fees for publishers. Second, I find that the DRX combined contracts did not (and could not) foreclose competition among publisher ad servers. Third, I conclude that the data do not support the conclusion that publishers were coerced by the purported tie to AdX. Fourth, I find that publisher adoption of DFP was driven by DFP's high quality and low prices.

478) Based on my review of the documents and data, I conclude that Google's alleged tie of DFP to AdX (which in reality was not a tie but a product integration) did not harm competition in the alleged market for publisher ad servers and instead was procompetitive.

***1. The Alleged Tie Did Not Increase Google's Ad Server Fees***

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<sup>839</sup> See Dennis W. Carlton, "A General Analysis of Exclusionary Conduct and Refusal to Deal – Why Aspen and Kodak are Misguided," *Antitrust Law Journal*, Vol. 68, 2001, pp. 659-684, at p. 672.

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479) Professor Gans' theory and conclusion is that "Google's tie relied upon Google's market power in the ad exchange market (tying market) and harmed competition in the ad server market (tied market)."<sup>840</sup> A necessary (but not sufficient) condition for showing that Google's purported tie of DFP to AdX (i.e., restricting access to AdX RTB to publishers using DFP) harmed competition is to demonstrate that relevant prices—ad server fees—increased relative to a counterfactual world without the tie.<sup>841</sup> That is because if, as Professor Gans' claims, Google's tie led to rivals publisher ad servers being excluded, anticompetitive harm related to the tie would be observed as price increases.<sup>842</sup> Without an increase in prices as compared to a counterfactual world without a tie, there is no reliable evidence of anticompetitive harm to customers—in this case, publishers of web display ads. In this section, I examine the theory that Google's alleged tie led to higher prices to publishers and conclude that publishers were not harmed by Google's conduct.

480) Examining trends in the data reveal overall patterns that are inconsistent with Professor Gans' conclusions that Google's conduct was anticompetitive. Data showing publisher ad serving fees per thousand impressions reveal no evidence that these fees have significantly risen over time.<sup>843</sup> These patterns since 2014 are inconsistent with what one would expect to observe if Google priced its DFP services as a monopolist. This downward trend in server fees is consistent with procompetitive rationales

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<sup>840</sup> Gans Report, at ¶457.

<sup>841</sup> If the alleged tie foreclosed competition as Professor Gans claims this would have permitted Google to raise its prices or lower its quality. (See, e.g., Dennis W. Carlton, "A General Analysis of Exclusionary Conduct and Refusal to Deal – Why Aspen and Kodak are Misguided," *Antitrust Law Journal*, Vol. 68, 2001, pp. 659-684, at p. 672). If quality increased as a result of deeper integration, the quality-adjusted price would fall, even if nominal prices increased.

<sup>842</sup> "Finally, when tying does lead to exclusion of rivals, the welfare effects both for consumers and for aggregate efficiency are in general ambiguous. The loss for consumers arises because, when tied market rivals exit, prices may rise and the level of variety available in the market necessarily falls." (Michael D. Whinston, "Tying, Foreclosure, and Exclusion," *The American Economic Review*, Vol. 80, No. 4, 1990, pp. 837-859, p. 839).

<sup>843</sup> See Exhibit 4 and Figure 109.

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for integration and inconsistent with Professor Gans' conclusions that integration amounted to an anticompetitive tie.

481) Another striking feature of the underlying data on ad server fees—and which is also contrary to Professor Gans' assertions that Google's alleged tying conduct was anticompetitive—is the large number of publishers who pay no server fees at all. Data show that from January 2020 to June 2023, [REDACTED] of DFP publishers paid no server fees.<sup>844</sup>

482) The documentary record is inconsistent with any price increases resulting from rivals exiting the market.<sup>845</sup> Moreover, “[a]d serving volumes had been steadily growing in all regions” over the same period that prices were declining,<sup>846</sup> which is inconsistent with foreclosure of rivals. Even if Google's business practices ultimately attracted customers and resulted in rivals losing customers, such shifts (lower prices and higher output) are procompetitive.<sup>847</sup>

483) This data and documentary evidence is inconsistent with Professor Gans' conclusion that Google's alleged tie resulted in anticompetitive harm in the publisher ad server market. The reality is that most publishers use DFP for free.

**2. The Data are Inconsistent with Professor Gans' Theory that Publishers Chose DFP Because They Were Coerced by the Alleged Tie.**

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<sup>844</sup> See Figure 45.

<sup>845</sup> A 2010 Google pricing review found ad serving fees to be on a decreasing trend, having “declined steeply from 04-08” and were “still dropping gradually 08-present.” This indicates that Google did not raise ad serving prices but in fact, lowered them post-DoubleClick acquisition (GOOG-DOJ-09841308, at -312).

<sup>846</sup> GOOG-DOJ-09841308, at -324.

<sup>847</sup> Again, harm to rivals does not equal harm to competition. See B. Douglas Bernheim and Randal Heeb, “A Framework for the Economic Analysis of Exclusionary Conduct,” In *The Oxford Handbook of International Antitrust Economics*, Vol. 2, Eds. Roger D. Blair and D. Daniel Sokol, Oxford: Oxford University Press, Chapter 1, 2015, pp. 3-39, at p. 28.

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484) The data are inconsistent with Professor Gans' claims that conditioning access to AdX on licensing DFP "coerced" or otherwise materially impacted publishers' choices of ad servers.<sup>848</sup> According to Professor Gans, Google coerced publishers to use DFP as a condition of access to its AdX exchange and that publishers were susceptible to this coercion because of the fear that they would lose access to Google Ads demand on AdX.<sup>849</sup> In this section, I examine whether publishers who adopted DFP did so primarily to access AdX and conclude that they did not.

485) If publishers adopted DFP primarily to access AdX, the data would show that publishers using DFP were selling impressions only on AdX. In other words, if access to AdX is the cause of DFP adoption for those publishers exposed to the tie, one would expect those publishers adopting DFP to depend on AdX to sell their inventory. To examine this hypothesis, I examine both the extent to which publishers adopting DFP use AdX at all, as well as the extent to which those DFP publishers that use AdX rely on it to sell their impressions.

486) Exhibit 27 shows that the share of DFP publishers who do not use AdX is substantial: [REDACTED] of publishers who used DFP from June 2013 through March 2023 never used AdX.<sup>850</sup> Thus, the vast majority of DFP publishers do not use AdX at all, which is contrary to Professor Gans' assertion that access to AdX was the cause of DFP adoption.<sup>851</sup>

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<sup>848</sup> Fourth Amended Complaint, at ¶19. *See* Gans Report, at ¶416(d). ("Google contractually tied its ad exchange (AdX) and its publisher ad server (DFP), meaning that publishers wanting to access AdX demand in any form (in real-time or otherwise) were forced to sign a combined DFP-AdX contract.").

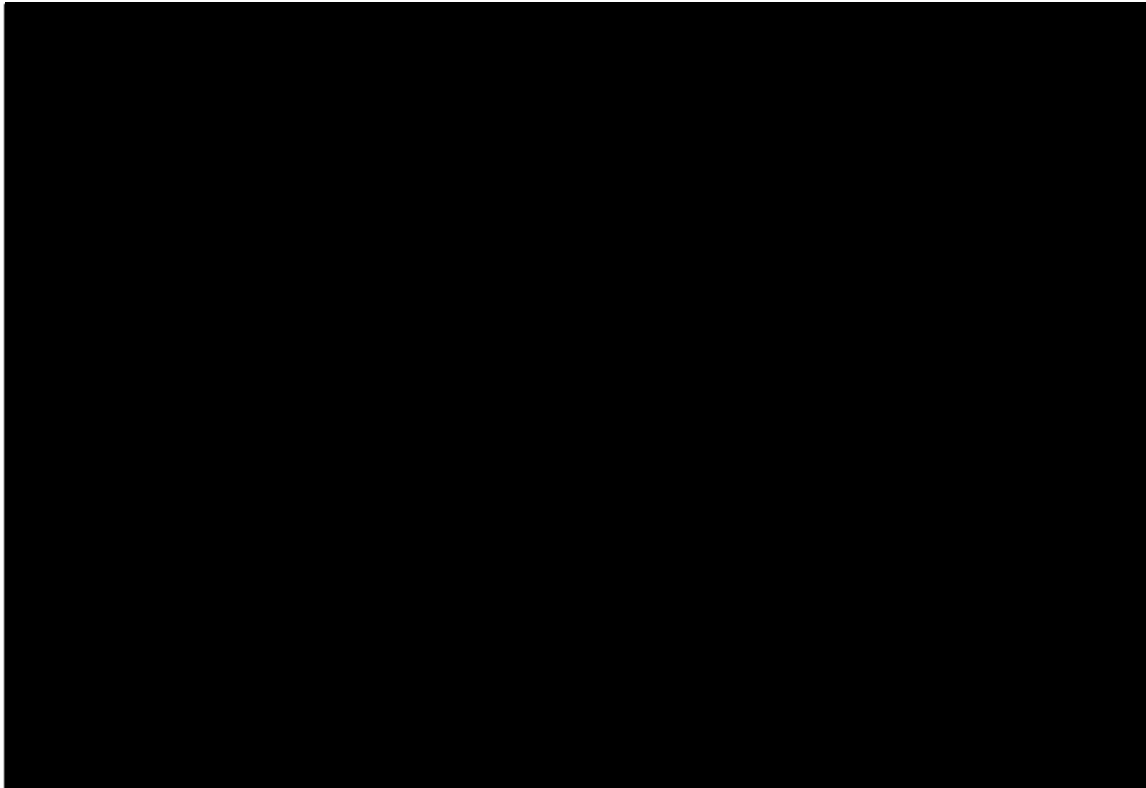
<sup>849</sup> Fourth Amended Complaint, at ¶19. *See* Gans Report, at ¶416(d).

<sup>850</sup> Figure 138 shows that the number of DFP publishers who do not use AdX is substantial.

<sup>851</sup> Due to the high impression threshold that is required to use AdX, it makes sense that this small volume of publishers that choose to use AdX represents a large volume of impressions overall. Figure 141 shows that from 2015 to 2022, between [REDACTED] and [REDACTED] impressions per month on DFP are from publishers that use AdX.

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**Exhibit 27**



Notes: Publishers present in DFP Reservations that could be matched to AdX in at least one month during the time period and that are associated with positive non Open Bidding impression volume are classified as “DFP publishers using AdX.” All others are classified as not using AdX.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

487) While DFP publishers that use AdX clearly account for a large volume of impressions,<sup>852</sup> data also show that DFP publishers who use AdX still sell [REDACTED] percent of their impressions somewhere other than AdX.<sup>853</sup> This observation is inconsistent with Professor Gans’ allegation that access to AdX was the driving force behind DFP adoption, and instead is more consistent with DFP providing a great deal of value apart from its ability to access AdX. Given these data, it is my opinion that the alleged tie would not likely be the reason that most publishers adopted DFP. Rather, most publishers’ activity

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<sup>852</sup> See Figure 141.

<sup>853</sup> See Figure 142.

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indicates that they adopted DFP because (as discussed in more detail below) it is a high-quality ad server with a low price, and these publishers would likely have adopted it with or without access to AdX.<sup>854</sup>

488) I also examine the possibility that the alleged “contractual tie” coerced or otherwise impacted publisher behavior. I use the data to determine the size of the publisher population that could have been impacted by the tie. For that analysis, I group publishers by their use of DFP and AdX before and after the “contractual tie” that Professor Gans asserts to be in place as of June 2016.<sup>855</sup> As I show next, for the vast majority of publishers using AdX and DFP, the policy of having them enter into one contract covering both AdX and DFP was not material. First, the June 2016 change could not have coerced publishers already using DFP before June 2016 into using DFP because, through their marketplace choices, they had already demonstrated a revealed preference for DFP. Second, publishers who appear in Google data for the first time after June 2016 and are only associated with AdX sales, clearly were not coerced into licensing DFP. Indeed, that this group of publishers exists is inconsistent with Google having implemented a tie—contrary to Professor Gans’ conclusions—because a significant share of publishers could access AdX without using DFP. Third, publishers that begin using DFP from June 2016 forward that do not sell inventory through AdX, also could not have been coerced into using DFP through its alleged tie to AdX. In other words, access to AdX cannot be the cause of DFP adoption for these publishers. While Professor Gans asserts that AdX publishers were coerced to use DFP, he fails to acknowledge data showing that these publishers apparently either used AdX without DFP or preferred

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<sup>854</sup> As one industry rival notes, brands use Google because “[i]t’s reliable – both from an infrastructure perspective and a business one.” (Chris Shuptrine, “What are the Main Google Ad Manager Alternatives? A 2023 Guide,” Kevel, November 1, 2021, available at: <https://www.kevel.com/blog/gam-alternatives>).

<sup>855</sup> “In 2016, Google then imposed a contractual tie between its exchange and its publisher ad server.” (Gans Report, at ¶407.) “By June 2016, Google made the Unified DFP/AdX Contract (DRX Contract), a contract for DFP and AdX, the default and prevented the creation of new AdX-only contracts.” (Gans Report, at ¶446).

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DFP even without using AdX, nor does he examine whether AdX publishers also preferred DFP prior to any purported contractual tie and therefore needed no coercion to use it.<sup>856</sup> The data show that collectively, these three groups of publishers comprise [REDACTED] percent of publishers present at any point in time in the data.<sup>857</sup>

489) Data indicate that removing the [REDACTED] percent of publishers that could not have been coerced to use DFP by the “contractual tie” that Professor Gans asserts leaves only [REDACTED] percent of the publishers in the dataset that could potentially have been impacted by the alleged tie: (1) those that used only AdX prior to the contracting policy change, and then continued to use AdX with DFP after the contracting policy change ([REDACTED]) and (2) those that joined the dataset after the contracting policy change, and used both AdX and DFP (11.4 percent).<sup>858</sup> As a result, [REDACTED] percent is an upper bound on the number of publishers that could have been impacted by the alleged tie. This is an upper bound because it assumes that every publisher in this group would have adopted a server other than DFP in the counterfactual world without the tie—which may well not be a reasonable assumption given the intrinsic benefits of DFP that are demonstrated in the documentary record. This share of publishers is too small to have foreclosed competition from rival publisher ad servers.

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<sup>856</sup> I also note that documents are consistent with other reasons for publishers adopting both AdX and DFP that are unrelated to the tying theory that Professor Gans describes. For example, some publishers delegate decisions about the management of their inventory to third parties who make decisions about the use of ad tech on their behalf. In these cases, the choice to use AdX and DFP (or other configurations) may be based on the preferences of one entity and applied across the publisher relationships it manages. Currently, the name that Google uses for this system is Multiple Customer Management (“MCM”). Google describes the MCM relationship between publisher and the delegated third-party as a “child” and “parent” relationship, respectively: “Publishers can delegate management of their Ad Manager network to a third-party publisher upon request. This establishes a parent-child relationship, where the network that requests access is the ‘parent publisher,’ and the network that grants access is the ‘child publisher.’” (Google Ad Manager Help, “About Multiple Customer Management,” available at: <https://support.google.com/admanager/answer/11130475>. Accessed July 29, 2024).

<sup>857</sup> See Figure 143.

<sup>858</sup> See Figure 143.



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490) I also examine how these potentially coerced publishers use DFP to determine the extent to which access to AdX was likely a key motivating factor in their decision to adopt DFP, and thus the likelihood that they were actually coerced. Data show that of these [REDACTED] percent of publishers who adopted DFP following the contracting policy change, only [REDACTED] percent of their impressions were sold through AdX.<sup>859</sup> This is inconsistent with AdX (or access to Google Ads demand) being the driver of DFP adoption as Professor Gans' concludes.

491) Another central part to Professor Gans' claim that Google forced publishers to take DFP is that Google made "Google Ads demand exclusive to AdX amongst exchanges, and leading publishers to consider AdX a "must-have" exchange."<sup>860</sup> As discussed above, the documentary evidence demonstrates that this assertion is not true. First, Google provided technical solutions to allow advertisers with third-party ad servers to access AdX or Google Ads directly.<sup>861</sup> Second, many advertisers using Google Ads multi-home, buying impressions on exchanges other than AdX. Data are consistent with the documentary evidence. While a sizeable amount of Google Ads demand spend goes through AdX, since June 2016 (when Professor Gans asserts that Google put in place a "contractual tie"), approximately \$1.5 billion in ad spend has gone through third-party exchanges.<sup>862</sup> In fact, the amount transacted

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<sup>859</sup> See Figure 144

<sup>860</sup> "Around the same time, Google limited its ad-buying tool for small advertisers to Google's ad exchange (AdX), making Google Ads demand exclusive to AdX amongst exchanges, and leading publishers to consider AdX a "must-have" exchange." (Gans Report, at ¶416(a)).

<sup>861</sup> GOOG-DOJ-13233139, at -139 ("When AdX was first launched as a standalone product, it possessed the ability to generate an ad tag that could be used to request ads from AdX. Even after we brought AdX and DFP together in DRX and then Google Ad Manager (AM), the ability to use AdX as a stand-alone SSP has persisted."); GOOG-DOJ-AT-00055901, at -902 ("Ad Connector closes a critical gap in our strategic offering, giving us access to inventory we wouldn't otherwise have access by directly working with lost publishers, such as eBay, LinkedIn, Dailymotion, Twitter, Pinterest.").

<sup>862</sup> See Figure 137 for the monthly amount of Google Ads spend purchased from third-party ad exchanges.

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monthly through third-party exchanges is significant, having grown from [REDACTED] in June 2016 to [REDACTED] in January 2023.

492) In addition, data indicate that many publishers using AdX earn more from non-Google Ads sources than they do from Google Ads. As seen in the data, the average revenue per thousand impressions paid to publishers has largely been higher for DV360, Open Bidding, and third-party exchanges than Google Ads.<sup>863</sup> Professor Gans' analysis fails to explain how, as a matter of economics, access to Google Ads is an essential input for publishers who earn substantially more revenue from non-Google Ads sources.

493) In sum, the data do not support Professor Gans' conclusion that publishers using DFP and AdX were coerced to do so by Google's alleged tie. Rather, the data show that most publishers' decisions to adopt DFP as their server could not have been affected by the alleged tie. Further, the small minority of publishers that could have been impacted by the alleged tie sell a majority of their impressions outside of AdX. Rather than AdX being the only way for publishers to access Google Ads demand, consistent with the documentary evidence, the data show that Google Ads demand is available outside of AdX. Even the upper bound of publishers who could have potentially been impacted by the alleged tie is too small to have foreclosed rivals.

**3. *The Evidence is More Consistent with Publishers Choosing DFP Over Rival Ad Servers Because it is a Superior Product at a Low Price***

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<sup>863</sup> See Figure 145.

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494) While the evidence is inconsistent with Professor Gans' conclusion that publishers were coerced to use DFP, it is consistent with publishers willingly adopting DFP due to its combination of high quality—which in large part stems from the fact that its vertical integration facilitated Google designing DFP and AdX to work together—and highly competitive low prices that efficiently account for the complementary nature of ad tech components and indirect network effects between publishers and advertisers. It is my opinion that in a counterfactual world in which Google made AdX RTB equally available on DFP and third-party ad servers, publisher demand for DFP would likely also been robust. Put differently, given the high quality and low price of DFP, the marginal impact of the conduct that Professor Gans' claims constitutes a tie on publisher decisions to adopt DFP is likely to be negligible and unlikely to be of sufficient magnitude to adversely impact competition.

495) My review of relevant documents indicates that Google's business rationale for unifying elements of its ad tech stack was market-driven.<sup>864</sup> In the candidate ad server market, Google's DFP is held in high regard as "without question the most impressive ad management server in existence."<sup>865</sup> Even Google's competitors saw that the quality of Google's ad tech stack led to competition on the merits. As described by Kevel, an industry competitor, "Google is solely to blame" for the departure of

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<sup>864</sup> As early as 2011, Google recognized that they would need to unify their supply side products to compete: "[We] don[']t want to sell it as all separate parts. Our competitors sell it as one item." (GOOG-DOJ-06858337, at -459). In 2014, industry publications indicated that "[c]ertainly the merging of the SSP and ad exchange isn't new" and that the "blurring of borders is a sign of market stability." (Ryan Joe, "Defining SSPs, Ad Exchanges And Rubicon Project," AdExchanger, February 7, 2014, available at: <https://www.adexchanger.com/yield-management-tools/defining-ssps-ad-exchanges-and-rubicon-project/>). This was around the same time that Google began formally investigating the pros and cons of joining DFP and AdX into a single platform, as exemplified in this internal Google document titled "DFP+Adx Unification Pro / Con review". (GOOG-TEX-00715568, at -568).

<sup>865</sup> OKO, "Best publisher ad servers on the market," February 16, 2023, available at: <https://oko.uk/blog/best-publisher-ad-servers-on-the-market>.

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OpenX (which shut down in 2019)<sup>866</sup>—but not in the way that Professor Gans would argue.<sup>867</sup> Instead of citing concerns of anticompetitive behavior or deprivation of access to bids from Google Ads, Kevel explained that “[a]fter their acquisition of DoubleClick in 2007, Google did a fantastic job improving this product and creating an ad server for both the long-tail and the large media brands, making it hard for others to compete.”<sup>868</sup>

496) As predicted by economic theory, DFP offers heightened protection<sup>869</sup> and publishers prefer DFP’s better features<sup>870</sup> over competing products.<sup>871</sup> Survey responses suggest that a considerable portion of publishers value using DFP for transacting ad impressions. For instance, a 2010 DFP customer experience survey found that 80 percent of customers “rated overall satisfaction at least 7/10.”<sup>872</sup>

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<sup>866</sup> Chris Shuptrine, “OpenX Ad Server Alternatives,” Kevel, December 19, 2018, available at: <https://www.kevel.com/blog/openx-ad-server-alternatives>.

<sup>867</sup> Chris Shuptrine, “OpenX Ad Server Alternatives,” Kevel, December 19, 2018, available at: <https://www.kevel.com/blog/openx-ad-server-alternatives>.

<sup>868</sup> Chris Shuptrine, “OpenX Ad Server Alternatives,” Kevel, December 19, 2018, available at: <https://www.kevel.com/blog/openx-ad-server-alternatives>.

<sup>869</sup> Protections offered by Google ad tech products include robust blocking capabilities that “prohibit content that is harmful to users and the overall advertising ecosystem.” (Google Advertising Policies Help, “Google Ads policies,” available at: <https://support.google.com/adspolicy/answer/6008942>. Accessed July 6, 2023). Unlike rival ad servers which may have a universally applied set of prohibited ads, GAM offers granular controls that allow publishers to fine tune and block ads that may be unsuitable for their brand. For example, a publisher geared towards children can elect to block swimwear ads that may feature too much skin exposure. (Google Ad Manager, “Improving protections for publishers,” available at: <https://admanager.google.com/home/resources/improving-protections-publishers/>. Accessed July 6, 2023).

<sup>870</sup> Industry publications praise DFP’s “interesting user interface, simple reporting and management tools,” “a long list of impressive features,” and “vast monetization options and reliability” (PubLift, “Best Ad Servers for Publishers in 2024,” available at: <https://www.publift.com/blog/best-ad-servers-for-publishers>. Accessed July 30, 2024; Aleesha Jacob, “Best Ad Servers for 2024,” MonetizeMore, April 2, 2024, available at: <https://www.monetizemore.com/blog/top-ad-servers-for-publishers/>). DFP also offers inventory forecasting and the ability to fill remnant inventory with house ads (Google Ad Manager, “How forecasting works,” available at: <https://support.google.com/admanager/answer/7649125>. Accessed July 6, 2023; Google Ad Manager Help, “House line items,” available at: <https://support.google.com/admanager/answer/79305>. Accessed July 6, 2023).

<sup>871</sup> Some of DFP’s features may not be available on competing products. For example, FreeWheel appears to only support video and CTV ads as opposed to a wide variety of formats, and Revive Adserver does not support inventory forecasting. (Invidi, “These Are The Supply-Side Ad Servers Trying To Win The Next Generation Of TV,” available at: <https://www.invidi.com/news/these-are-the-supply-side-ad-servers-trying-to-win-the-next-generation-of-tv/>. Accessed July 6, 2023; Revive Adserver, “Forecasting Possible?” available at: <https://forum.revive-adserver.com/topic/1364-forecasting-possible/>. Accessed July 6, 2023).

<sup>872</sup> GOOG-DOJ-09841308, at -327.

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Similarly, a 2022 study by Advertiser Perceptions found that GAM was the most preferred supply-side partner among publishers—73 percent of publishers indicated that they used GAM, with 43 percent ranking it as their most preferred partner.<sup>873</sup> The preference for GAM was attributed to “Google ... really pay[ing] attention to what a publisher needs to make money, have security and be privacy protected.”<sup>874</sup> The most highly-rated DFP features according to Google’s survey were “[a]ccuracy of reports,” “[r]elevance of [r]eports,” “[a]d [d]elivery,” “[a]d [t]argeting,” and the “[a]bility to deliver various ad formats.”<sup>875</sup> Security is another major concern for many publishers<sup>876</sup>—something that Google’s robust policies, publisher controls, ad reviews, and ongoing initiatives address.<sup>877</sup> Moreover, Google’s investments in its ad server have led to the development of many useful features for publishers. Besides supporting a wide variety of ad formats (such as display, video, audio, and native ads), GAM also gives publishers a superior suite of features, such as the ability to set frequency caps, forecast inventory, and

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<sup>873</sup> Anthony Vargas, “Google Reigns Supreme In Latest Advertiser Perceptions SSP Report, But Competition Is Tight Among Everyone Else,” AdExchanger, February 4, 2022, available at: <https://www.adexchanger.com/online-advertising/google-reigns-supreme-in-latest-advertiser-perceptions-ssp-report-but-competition-is-tight-among-everyone-else/>.

<sup>874</sup> Anthony Vargas, “Google Reigns Supreme In Latest Advertiser Perceptions SSP Report, But Competition Is Tight Among Everyone Else,” AdExchanger, February 4, 2022, available at: <https://www.adexchanger.com/online-advertising/google-reigns-supreme-in-latest-advertiser-perceptions-ssp-report-but-competition-is-tight-among-everyone-else/>.

<sup>875</sup> GOOG-DOJ-09841308, at -327.

<sup>876</sup> John Murphy, “A Publisher’s Guide to Evaluating Ad Security and Ad Quality Solutions,” Confiant, June 30, 2020, available at: <https://www.confiant.com/news/ad-security-ad-quality>.

<sup>877</sup> See Google Ad Manager, “We’ve got your back,” available at: <https://admanager.google.com/home/capabilities/brand-safety/>. Accessed July 6, 2023.

Google has also supported and implemented initiatives to combat the sale of counterfeit ads, such as IAB Tech Lab’s ads.txt standard. Ads.txt helps publishers “mak[e] it more difficult to sell counterfeit inventory” and has since been implemented by Google in its ad tech products. (Google Ad Manager, “Improving protections for publishers,” available at: <https://admanager.google.com/home/resources/improving-protections-publishers/>. Accessed July 6, 2023).

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fill remnant inventory with house ads.<sup>878</sup> These advantages provide a compelling reason for publishers to choose Google's ad server.

497) Furthermore, as the operator of a multi-sided platform, Google has an economic incentive to continuously improve its ad tech offerings to ensure that users are shown high-quality, relevant ads. According to a Google blog, "[p]rotecting users from bad ads and malicious actors is key to a healthy revenue stream."<sup>879</sup> When users respond to malware and/or inappropriate ad content by installing ad blockers, Google recognizes that "every publisher pays the price, as it means they earn less money from the free content we all enjoy. For advertisers who create good ads, these obstacles make it tougher to connect with customers. And for consumers, it means they'll see less useful ads."<sup>880</sup> Consistent with this economic incentive, Google "invest[ed] in new technology to better identify policy-violating behavior at the account level...result[ing] in 2.7 billion bad ads being taken down in 2019."<sup>881</sup> Google's

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<sup>878</sup> Google Ad Manager Help, "Video and audio," available at: <https://support.google.com/admanager/topic/13127106>. Accessed July 6, 2023; Google Ad Manager Help, "Native ads," available at: <https://support.google.com/admanager/topic/6366825>. Accessed July 6, 2023; Google Ad Manager Help, "Set frequency caps for a line item," available at: <https://support.google.com/admanager/answer/82242?hl=en&sjid=514896419620330533-NA>. Accessed July 6, 2023; Google Ad Manager, "How forecasting works," available at: <https://support.google.com/admanager/answer/7649125?hl=en&sjid=514896419620330533-NA>. Accessed July 6, 2023; Google Ad Manager Help, "House line items," available at: <https://support.google.com/admanager/answer/79305>. Accessed July 6, 2023.

<sup>879</sup> Karen Scruggs, "Safeguard your advertising business," Google Ads & Commerce Blog, May 5, 2020, available at: <https://blog.google/products/ads-commerce/safeguard-your-advertising-business/>.

<sup>880</sup> Karen Scruggs, "Safeguard your advertising business," Google Ads & Commerce Blog, May 5, 2020, available at: <https://blog.google/products/ads-commerce/safeguard-your-advertising-business/>. Further, Google sees "[r]educ[ing] the prevalence of ad blocking by moving the industry to deliver quality ad experiences that give consumers choice" as part of building a "[h]ealthy [and] sustainable ads ecosystem." (GOOG-DOJ-03725708, at -722).

<sup>881</sup> Karen Scruggs, "Safeguard your advertising business," Google Ads & Commerce Blog, May 5, 2020, available at: <https://blog.google/products/ads-commerce/safeguard-your-advertising-business/>. Additionally, Google found that Adblock software on mobile browsers for the open web had increased from 145 million in January of 2015 to 380 million in December of 2016. Google's plan following this was to "[d]evelop a better ads standard," "[p]rovide users choice," and to "[e]ngage with industry" in order to decrease "[i]ndiscriminate ad blocker usage." (GOOG-TEX-00348289, at -420-421).

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technological innovations for stopping bad ads have continued and compounded over time.<sup>882</sup> These advancements and high standards for ads are consistent with investments resulting in quality that stands out to advertisers, publishers, and users.<sup>883</sup> The picture painted by these documents differs starkly from Professor Gans' narrative of coercion based on access to real-time bids from AdX. Instead of stifling competition in the space, Google documents and data indicate that Google has innovated to create platforms that share high degrees of reliability, customizability, and security, while providing industry-leading features.<sup>884</sup>

498) My review of the documents finds that the high-quality offering of DFP combined with Google's low pricing provided ample incentives for publishers to adopt it as their server. As discussed in more detail in Section X.D.1 above, [REDACTED] of publishers pay no server fees for using DFP.<sup>885</sup> If, as Professor Gans claims, publishers are price-sensitive and would switch to ad tech tools with lower fees absent Google's alleged anticompetitive conduct, one would expect publishers to flock to DFP based

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<sup>882</sup> For example, during the COVID-19 outbreak, Google "built new detection technology and [...] improved [its] existing enforcement systems to stop bad actors." (Scott Spencer, "Stopping bad ads to protect users," Google Ads & Commerce Blog, April 30, 2020, available at: <https://www.blog.google/products/ads/stopping-bad-ads-to-protect-users/>); *See also* Scott Spencer, "Our annual Ads Safety Report," Google Ads & Commerce Blog, March 17, 2021, available at: <https://blog.google/products/ads-commerce/ads-safety-report-2020/>; Pooja Kapoor, "Improving protections for publishers," available at: <https://admanager.google.com/home/resources/improving-protections-publishers/>. Accessed July 21, 2023.

<sup>883</sup> An example of Google's quality resonating with all parties engaged in digital advertising is a parenting and photo-sharing app and website called Tinybeans, which has reiterated many of these benefits from working with Google Ad Manager's suite of products. In addition to providing a free option to cater to all economic backgrounds, the founders of the website "want[ed] to make sure all of [their] users know their family data is safe and secure when they're on [the] app." Tinybeans was able to leverage Google Ad Manager's Audience Solutions to use first-party data, allowing "the company to use information securely provided by registered users to serve those users relevant, high-quality ads while maintaining their privacy." (Google Ad Manager, "Tinybeans helps families stay connected and create memories together," available at: <https://admanager.google.com/home/success-stories/tinybeans-helps-families-stay-connected-and-create-memories-together/>. Accessed July 21, 2023); *see also* Brock Munro, "Ads.txt for Publishers: What is it and how does it work?" PubLift, June 28, 2024, available at: <https://www.publift.com/blog/ads-txt-for-publishers>; Jessica Davies, "Ghost sites, domain spoofing, fake apps: A guide to knowing your ad fraud," Digiday, January 30, 2019, available at: <https://digiday.com/media/ghost-sites-domain-spoofing-fake-apps-guide-knowing-ad-fraud/>.

<sup>884</sup> To reiterate, this high degree of quality across different elements of the ad tech stack is due in large part to their integration; knowledge or processes from different stages can be shared freely, acting as natural complements to the benefit of customers.

<sup>885</sup> *See* Figure 45.

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on its pricing alone. Lower pricing expands output by moving along a demand curve, and higher quality shifts out a demand curve. Both of these conditions lead to higher levels of output in equilibrium. As I have noted, lower prices and higher quality are a natural implication of deeper integration of the ad tech stack.<sup>886</sup> To the extent that Professor Gans views the deeper integration of Google's exchange and ad server as a tie, he must (as a matter of economics) demonstrate that the widespread adoption of DFP does not stem from its low pricing and high-quality. Otherwise, evidence that the alleged tie (e.g., integration) is the prime driver of the adoption of DFP does not represent harm to competition.<sup>887</sup>

**XI. PROFESSOR GANS DOES NOT DEMONSTRATE THAT GOOGLE ANTICOMPETITIVELY "STEERED" INVENTORY TO ITS OWN AD EXCHANGE**

499) Professor Gans contends that Google used its alleged ad server monopoly to steer publishers toward Google's ad exchange and away from rival ad exchanges.<sup>888</sup> He focuses on four categories of conduct: 1) the implementation of unified pricing rules; 2) the implementation of dynamic allocation and enhanced dynamic allocation; 3) the imposition of limits on the number of line items publishers could set in Google's ad server; and 4) redaction of certain information from data transfer files Google shared with publishers.<sup>889</sup> As I explain below, documents and data show that none of this conduct was anticompetitive. In fact, Google recently introduced new features in GAM to improve header bidding

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<sup>886</sup> Google's pricing—which heavily subsidizes the use of DFP for small publishers in particular—is consistent with what standard economic theory predicts as efficient pricing by a firm operating an integrated multi-sided platform and managing indirect network effects efficiently, as discussed earlier. Figure 45 shows that the majority of DFP publishers do not pay any fees. This makes the entire open web more attractive for advertisers and publishers, and in this manner also benefits Google.

<sup>887</sup> See Figure 45, which shows that the majority of DFP publishers do not pay any fees.

<sup>888</sup> Gans Report, at ¶458.

<sup>889</sup> Gans Report, at ¶458.



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support,<sup>890</sup> which is inconsistent with Professor Gans' claim that Google's actions were driven by anticompetitive intent against third-party ad exchanges.<sup>891</sup>

**A. Unified Pricing Rules Had a Legitimate Business Rationale and Did Not Harm Competition**

500) Professor Gans contends that Google introduced Unified Pricing Rules (UPR) to increase transactions on its own ad exchange and reduce competitive pressure from rival exchanges, thereby harming competition in his candidate ad exchange market and large advertiser buying tools market.<sup>892</sup> While Professor Gans throughout his report faults Google for not treating its rivals on equal terms, in his discussion of UPR he argues exactly the opposite and criticizes Google for implementing uniform rules. In my opinion, Professor Gans' conclusions are flawed and inconsistent with the data and documentary evidence. In this section, I explain that documents indicate the business rationale for UPR was procompetitive and benefited advertisers without harming publishers. I also show that Professor Gans has not demonstrated that UPR harmed publishers or hampered rivals' ability to exert competitive pressure in his candidate exchange market.

***1. Background on Unified Pricing Rules (UPR)***

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<sup>890</sup> Google Ad Manager, "Improved header bidding support in Google Ad Manager," available at: <https://blog.google/products/admanager/improved-header-bidding-support-in-google-ad-manager/>. Accessed April 1, 2024.

<sup>891</sup> Gans Report, at ¶¶677-687.

<sup>892</sup> Professor Gans alleges that "[t]he first way in which Google anticompetitively restricted the operation of ad servers was by implementing Unified Pricing Rules (UPR)." According to Professor Gans, "Google's intent with UPR was to increase transactions on AdX and reduce competitive pressure from rival exchanges. Moreover, Google tried to hide its anticompetitive motives. Google publicly presented UPR as a positive innovation that would benefit publishers and used an unrelated change in auction format as a justification." Professor Gans further alleges that "UPR gave AdX an advantage over rivals at the expense of publisher choice and ability to effectively monetize their inventory, and UPR led to more transactions through Google's ad-buying tools and exchanges at the expense of third parties." Professor Gans concludes that "that Google's introduction of UPR (i) was also motivated by Google's intent to reduce floors and increase share for its ad buying tools and (ii) allowed Google's ad buying tool for large advertisers (DV360) to clear more impressions at the expense of competitors." Gans Report, at ¶¶459, 480, 490, 500.

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501) In 2019, Google made two closely related auction changes. First, it announced that Google Ad Manager would move from a second-price auction to Unified First Price Auction (UFPA).<sup>893</sup> In a second-price auction, the high bidder wins but only pays the second-highest bid (or the floor price, if the floor price is higher than the second-highest bid). As I explain in Section V.C, in a first-price auction, the high bidder pays the amount of its bid. Most other exchanges ran first-price auctions.<sup>894</sup> Google's movement to UFPA obviated the need for differential price floors across ad exchanges.<sup>895</sup> While Professor Gans speculates about Google's motives, Plaintiffs do not contend this change to UFPA was anticompetitive.<sup>896</sup>

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<sup>893</sup> Sam Cox, "Simplifying Programmatic: First Price Auctions for Google Ad Manager," Google Ad Manager, March 6, 2019, available at: <https://blog.google/products/admanager/simplifying-programmatic-first-price-auctions-google-ad-manager/>; GOOG-DOJ-12077412, at -412.

<sup>894</sup> GOOG-DOJ-10736364, at -367.

<sup>895</sup> Milgrom Report, at ¶520 ("Before Google introduced the UFPA, publishers using GAM could improve both efficiency and revenue by setting different floor prices for bidders or demand sources depending on the order in which they were called. This important justification of setting different floor prices for different exchanges was eliminated in the UFPA, as discussed by Google engineers."); Milgrom Report, at ¶549 ("Let us see how setting exchange-discriminatory floor prices could help publishers maximize revenues in a system where the winning bids from multiple exchanges were evaluated sequentially. For example, consider a publisher that sequentially calls two exchanges in the waterfall: Exchange A before Exchange B. Suppose that the publisher believes that the distributions of advertiser values at both exchanges are identical and that the values of bidders at each exchange are statistically independent. Then the publisher's revenue-maximizing floor price for Exchange A is higher than that for Exchange B. This is because, by choosing a higher floor price for Exchange A, the publisher can try to extract a higher price from the first exchange, knowing that it can offer the impression to Exchange B if it fails to sell on Exchange A. Similarly, exchange-specific (and impression-specific) floor prices could improve publisher revenues when header bidding exchanges and AdX were not called simultaneously and used different auction rules, as I discussed in Section X.").

<sup>896</sup> Professor Gans insinuates that Google's move to a first-price auction was motivated by a desire to "weaken Header Bidding." Gans Report, at ¶485 ("Another 2018 email acknowledges that the roll-out of the first-price auction would weaken Header Bidding, stating 'we get the move to IP done which will make HB much less valuable.'"). However, more effective competition against header bidding is procompetitive, not anticompetitive. Moreover, Google documents suggest that its move to a first-price auction was an adaptation to market changes. For example, Google documents indicate that "the participants in Google's auction ... are on a 2nd price auction, whereas [Exchange Bidders] are on a 1st price auction, as are most header bidding integrations. This means that Authorized Buyers are not always able to compete on equal footing with other demand sources, and also creates confusion over auction dynamics about how the 2nd price and 1st price auctions interact. As a result, we'll move to a 1st price auction for everyone in 2019." (GOOG-DOJ-10736364, at -364). Similarly, "[m]any exchanges began to move from second-price to first-price auctions in the mid-to-late-2010s." Declaration of Nitish Korula on August 4, 2023 (GOOG-AT-MDL-008842393), at ¶7. By moving to first price auctions, "[it] saw a neutral to positive impact on a publisher's total revenue, and found evidence that first price auctions [ ] created a more competitive market, resulting in third parties ... and indirect line items (like those from header Bidding implementations) winning an increased share of impressions." (GOOG-AT-MDL-004300215, at -217).

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502) Second, in connection with the move to a first price auction, Google implemented unified pricing rules (UPR).<sup>897</sup> UPR allowed publishers to set price floors that applied equally to the GAM auction and to auctions run by third-party exchanges.<sup>898</sup> Google's shift to UPR increased auction simplicity and transparency.<sup>899</sup> UPR was a new feature that Google created to reduce publisher costs of manually inputting floors across exchanges in a unified first price auction. Prior to UPR, only the AdX auction was affected by price floors set by publishers in GAM; a publisher wishing to impose floors for other exchanges participating in Open Bidding or header bidding had to navigate to each third-party exchange, log in, navigate through each exchange's interface, and manually input the desired floors.<sup>900</sup> Uniform pricing floors are not unique to Google: [REDACTED]

[REDACTED].<sup>901</sup>

## 2. UPR Was Procompetitive and Benefited Advertisers

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<sup>897</sup> Sam Cox, "Simplifying Programmatic: First Price Auctions for Google Ad Manager," Google Ad Manager, March 6, 2019, available at: <https://www.blog.google/products/admanager/simplifying-programmatic-first-price-auctions-google-ad-manager/>; Jason Bigler, "An Update on First Price Auctions for Google Ad Manager," Google Ad Manager, May 10, 2019, available at: <https://www.blog.google/products/admanager/update-first-price-auctions-google-ad-manager/>.

<sup>898</sup> Jason Bigler, "An Update on First Price Auctions for Google Ad Manager," Google Ad Manager, May 10, 2019, available at: <https://www.blog.google/products/admanager/update-first-price-auctions-google-ad-manager/>.

<sup>899</sup> According to Google documents, one of the motivations for UPR was to simplify price floors for advertisers and allow them to "pay exactly what they bid." (GOOG-DOJ-AT-00655825, at -827). As internally noted, buyers may "struggle to optimize when bidding across different channels due to lack of symmetry: different auction rules and different floor prices can apply for the same impression." (GOOG-DOJ-AT-00655825, at -827). In other words, pre-UPR pricing rules "exponentially increase[d] the volume of queries in the ecosystem and the amount of duplication, with buyers dealing with multiple instances of the same impression." (GOOG-DOJ-13501237, at -243). This self-competition "force[d] buyers to throttle queries" and made it "harder to evaluate which impressions are most valuable." (GOOG-DOJ-13501237, at -243).

<sup>900</sup> GOOG-DOJ-AT-02423555, at -555. ("Currently, for legacy AdX pricing rules, publishers can specify that the rule's reserve be treated as a hard floor, such that no bids can transact below the floor, or as a Target CPM (tCPM) floor, so that the average CPM that transacts on that rule is at or above the specific CPM target."); Jason Bigler, "An Update on First Price Auctions for Google Ad Manager," Google Ad Manager, May 10, 2019, available at: <https://www.blog.google/products/admanager/update-first-price-auctions-google-ad-manager/>.

<sup>901</sup> [REDACTED]

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503) UPR prevented opportunistic publishers from attempting to “squeeze” surplus from advertisers by setting multiple price floors to fish for the highest price.<sup>902</sup> The ability to set granular price floors across multiple platforms with different sets of policies and rules incentivizes “multi-call[ing]”—that is, it “incentivizes pubs to call the same demand source multiple times through different channels with different floor prices (e.g. DBM is called through AdX, EB and HB with different floor prices), and to effectively fish for the highest price.”<sup>903</sup> This price-fishing behavior created a situation in which advertisers could unknowingly bid against themselves multiple times for the same impression.<sup>904</sup> Price-fishing generates a negative externality that reduces the revenue of publishers.<sup>905</sup>

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<sup>902</sup> GOOG-TEX-00096527, at -528. (“Publishers purposefully manipulate AdX floors (while keeping lower floors for 3PEs via header bidding) in an effort to ‘squeeze’ AdX buyers for revenue.”). Professor Gans points to documents indicating that some publishers attempted to (and succeeded in) circumventing UPR through a variety of strategies, and simply asserts, without a source to support his claim, that “Google took steps to shut down these circumventing strategies.” Gans Report, at ¶543. As a matter of economics, any practice that attempts to prevent opportunistic behavior by an unspecified number of customers may harm those customers, but it does not follow that this harms competition or customers overall.

<sup>903</sup> GOOG-DOJ-12948968, at -969.

<sup>904</sup> The record indicates that that these floors were used “in order to fool the DSP into overpaying” through publishers “send[ing] many call-outs to a single DSP at differing price levels.” (Levitte (Google) Deposition, at 232:10-233:1.) Also, a Google document notes that due to the “[e]ver-increasing complexity in the ecosystem,” there is an increase in “the volume of queries in the ecosystem and the amount of duplication, with buyers dealing with multiple instances of the same impression. The same document notes that this “results in self competition” for the buyers and it “also forces buyers to throttle queries to deal with the volume, making it harder to evaluate which impressions are most valuable, impacting publisher yield.” (GOOG-DOJ-13501237 at -261-262).

<sup>905</sup> Milgrom Report, at ¶522 (“UPR also benefited non-price-fishing publishers in two ways. First, it simplified the publisher’s process of setting floor prices applying to both Google and non-Google buyers using Open Bidding. Instead of setting floor prices separately using each exchange’s interface, a publisher needs to set just one UPR floor in GAM. Second, it mitigated an externality that would reduce the revenues of all publishers, arising when a multi-homing advertiser faced with price-fishing publishers finds it difficult to coordinate its many bids and is incentivized to reduce its bids or not bid at all on some impressions.”); Milgrom Report, at ¶537 (“By protecting advertisers from price-fishing, UPR also benefited publishers. Although individual publishers might be incentivized to engage in price-fishing tactics, advertisers might end up bidding less on all impressions, which in turn could end up harming all publishers. This is a well-known economic phenomenon akin to the tragedy of the commons: price-fishing publishers impose an externality that harms advertisers and other publishers. By preventing publishers from engaging in that type of gamesmanship, UPR protected advertisers and publishers that were not price-fishing.”).

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504) While discriminatory floors used in this way might be good for an individual publisher, they are bad for advertisers, other publishers, and digital advertising as a whole.<sup>906</sup> Discriminatory pricing floors are bad for advertisers because they transfer advertiser surplus to the publisher; a Senior Product Manager testified that these floors were often used “to fool the DSP into overpaying.”<sup>907</sup> This reduces advertisers’ ROI and hence their incentives to advertise, and steers advertisers towards buying doors they otherwise viewed as less preferred and ultimately away from the open web. With fewer advertisers to match with viewers at publisher websites, ad quality declines, and users are more likely to be served irrelevant ads. This negatively impacts not only Google’s ecosystem, but digital advertising on the open web more generally. This initiates a vicious cycle: less advertising on the open web reduces the value for publishers, which reduces the value to advertisers and so on until a new equilibrium is reached.<sup>908</sup> In this new equilibrium, all participants—including other publishers, advertisers, and Google—get slices of a smaller pie.

505) UPR mitigated the effects of multi-calling and reduced self-competition.<sup>909</sup> This benefited advertisers (who directly received more surplus and indirectly received additional surplus as a result of positive complementarities and network effects). UPR also enhanced transparency and simplified the

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<sup>906</sup> See, e.g., GOOG-DOJ-07782646, at -650 (“Today, buyers struggle to optimize when bidding across different channels due to **lack of symmetry**: different auction rules and different floor prices can apply for the same impression ... With this change[,] [a]ll indirect demand ... compete on equal footing (i.e. consistent rules apply across channels) in the same unified auction; all buyers have an equal opportunity to win an impression”).

<sup>907</sup> [REDACTED] (Google) Deposition, at 232:13-232:18.

<sup>908</sup> See, e.g., Deposition of Chris LaSala (Google) on October 20, 2020, at 120:21-121:22.

<sup>909</sup> Declaration of Nitish Korula on August 4, 2023 (GOOG-AT-MDL-008842393, at -434); GOOG-DOJ-AT-00655825, at -827; GOOG-DOJ-12948968, at -969.

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process for advertisers, who no longer needed to optimize in response to differential floors across exchanges.<sup>910</sup>

### 3. *UPR Did Not Harm Publishers*

506) As explained below, UPR was a procompetitive innovation that benefited the display ads ecosystem because at the same time it benefited advertisers, it did not harm publishers as whole. Economic theory and contemporaneous business documents indicate that the vast majority of publishers were not harmed from the shift to UPR, and many publishers benefited.<sup>911</sup>

507) As an initial matter, only publishers who would have implemented different floors in the way that Plaintiffs claim could have potentially been harmed by UPR. However, most DFP publishers transacting via AdX that use Open Bidding—i.e., publishers for which differential pricing floors across exchanges theoretically could be relevant—also use header bidding,<sup>912</sup> which provides a separate means to implement different pricing floors for different exchanges,<sup>913</sup> so only a small fraction of publishers

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<sup>910</sup> See, e.g., GOOG-DOJ-07782646, at -650 (“Today, buyers struggle to optimize when bidding across different channels due to **lack of symmetry**: different auction rules and different floor prices can apply for the same impression ... With this change[,] [a]ll indirect demand ... compete on equal footing (i.e. consistent rules apply across channels) in the same unified auction; all buyers have an equal opportunity to win an impression”); GOOG-DOJ-AT-00655825, at -827; Shubham Grover, “Google Ad Manager Unified Pricing Rules Guide,” AdPushUp, November 22, 2019, available at: <https://www.adpushup.com/blog/google-ad-manager-unified-pricing-rules-guide/>. (“Another benefit of unified pricing rules is that it encourages transparency and keeps buyers informed. Given there will be constant floors across all partners and exchanges, buyers will be in a position to plan better and will know better what the publisher expects rather than trying workarounds like Bid Shading.”).

<sup>911</sup> This is also consistent with documents indicating that, in the context of the first-price auction world, Google determined that “setting **low unified floors** generally allow pubs to **maximize yield**.” (GOOG-DOJ-06525908, at -917); see also GOOG-DOJ-AT-00608572, at -577 (Of publishers that responded to a survey conducted in February 2020, only 4 percent of those surveyed described UPR as having a negative impact on their business, while 30 percent described the change to UPR as having a positive impact and 55 percent described the change as having a neutral impact).

<sup>912</sup> See Figure 146 fn. 932.

<sup>913</sup> See Prebid, “pbjs.bidderSettings,” available at: <https://docs.prebid.org/dev-docs/publisher-api-reference/bidderSettings.html>. Accessed August 4, 2023. Other ad tech businesses also provide guidance on using these settings to implement adjustments to header bidding outcomes in advance of sending a query to the ad server. For example, Xandr, defines the bid\_cpm\_adjustment as “[a] multiplier value applied to the Demand Partner’s CPM bid price to adjust how the bids compete in auction. This does not change the actual bid or

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even in theory could have been harmed by UPR. For these publishers, UPR allowed implementation of up to 200 unique price rules, and each price rule could include up to 50 advertisers, leading to the possibility of 10,000 advertiser-specific floors. Recent auction-level data are inconsistent with Plaintiffs' theory that the limit of 200 price floors was an important constraint for many publishers. Google's auction-level data indicate that 40 percent of publishers had fewer than 20 floors and the "median" publisher used fewer than 200 floors.<sup>914</sup>

508) For the majority of publishers who were not actively trying to game the open auction system, UPR posed no threat, and at a minimum preserved access to low price, high quality DFP services. For example, the Washington Post said they were "not really concerned" about UPR since they did not "currently game the auction and prefer[red] the market to do its own thing."<sup>915</sup> An internal survey in February 2020 indicates that only 8 percent of publishers were negatively impacted by the shift to UPR, and 31 percent were positively impacted.<sup>916</sup>

509) The survey results are consistent with documentary record, which indicates that Google emphasized the "need to focus on simplifying the ecosystem to improve the overall value, rather than short-term tactical games."<sup>917</sup> Further, Google believed that UPR would both help to simplify the

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revenue payout, only the ranking of the bid in the auction." Xandr platform, "Demand Partner service," Microsoft Learn, March 6, 2024, available at: <https://learn.microsoft.com/en-us/xandr/digital-platform-api/demand-partner-service>.

<sup>914</sup> See Figure 147.

<sup>915</sup> GOOG-DOJ-07781369, at -370. See Figure 148 for a view of how The Washington Post was impacted as a result of UPR.

<sup>916</sup> GOOG-DOJ-AT-00608572, at -577. See also Shatanjee, "Advertiser Perception Survey: Publishers Positive About Policy Changes," Adtech Today, May 23, 2020, available at: <https://adscholars.com/blog/advertisers-perception-survey-publishers-positive-about-policy-changes/>. Accessed November 1, 2023.

<sup>917</sup> GOOG-DOJ-13501237, at -244.

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“[t]ime-consuming” and “hard to maintain”<sup>918</sup> process of publishers manually setting multiple price floors, and simultaneously assist advertisers who “struggle to optimize when bidding across different channels due to a lack of symmetry,” resulting in greater efficiencies and value for the entire ecosystem.

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510) Prior to UPR, publishers did not have a single interface where they could apply floors across all demand sources, but UPR provided that feature to reduce publisher costs of manually inputting floors across exchanges.<sup>920</sup> Publishers often found managing many discriminatory price floors unnecessarily cumbersome. As documents describe, “it’s widely believed that managing rules is far too difficult. This is because while the mechanisms are simple, it turns out they require complex configurations for even basic use-cases.”<sup>921</sup>

511) Public information from one of Google’s competitors is consistent with my opinion that publishers as a whole benefited from UPR. According to Magnite, “tests have shown that by embracing UPRs and removing the exchange floors, publishers can save time and help maximize their revenues.”<sup>922</sup>

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<sup>918</sup> GOOG-DOJ-07782646, at -665.

<sup>919</sup> GOOG-DOJ-07782646, at -688; *see* GOOG-DOJ-AT-00655825, at -827 (In a Google presentation titled “Unified Pricing Rules” from 2019, Google notes that one of its goals is a “[s]impler floor pricing strategy: reduced need to constantly optimize floors to reduce auction discount. Buyers pay what they bid (no bid-price discount) and floors don’t directly impact clearing price.”); GOOG-DOJ-06525908, at -915 (“New auction dynamics are easier to understand[;] Managing floor prices across all indirect sources of demand is more convenient[;] Less need for time-consuming floors optimizations to reduce auction discount”); GOOG-DOJ-09714662, at -662 (“[Google is] also introducing new Unified Pricing rules, to make it easy for publishers to set and manage pricing across all indirect sources of demand in the unified auction in Google Ad Manager.”); Deposition of Nitish Korula (Google) on October 28, 2021, GOOG-AT-MDL-007173923 (hereafter “Korula (Google) Deposition”), at 252:13-253:6; *see also* Levitte (Google) Deposition, at 230:23-231:9.

<sup>920</sup> GOOG-DOJ-06525908, at -915, -917.

<sup>921</sup> GOOG-DOJ-AT-00593475, at -475.

<sup>922</sup> Ashley Wheeler, “Flooring Best Practices Drive 107% Revenue Lift,” Magnite, October 4, 2022, available at: <https://www.magnite.com/blog/flooring-best-practices-drive-107-revenue-lift/>.



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Magnite's tests indicate that UPR resulted in greater demand for a publisher's impressions and more competitive auctions, thereby increasing publishers yields and revenues.<sup>923</sup>

512) In setting and managing differential price floors, publishers were imposing negative externalities on the ecosystem as a whole.<sup>924</sup> UPR eliminated those externalities while offering publishers an efficient way to set and manage price floors across multiple exchanges.<sup>925</sup>

**4. Professor Gans Does Not Demonstrate Harm to Publishers or Competition**

*a. Professor Gans Does Not Demonstrate Harm to Publishers*

513) Professor Gans' analysis of UPR improperly considers only its impact on publishers, rather than holistically considering the impact of UPR on both advertisers and publishers. Even setting this myopic approach aside, Professor Gans draws erroneous conclusions about the impact of UPR on publishers based on a sliver of data.<sup>926</sup> Based on a very narrow subset of data relating to a single publisher, the Daily Mail, Professor Gans draws sweeping conclusions (i) that "but for UPR, [AdX impressions] would have been transacted through other exchanges and likely at higher prices"<sup>927</sup> and (ii) that "[i]n the long run, as UPR dilutes publishers' ability to control the quality of their inventory,

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<sup>923</sup> Ashley Wheeler, "Flooring Best Practices Drive 107% Revenue Lift," Magnite, October 4, 2022, available at: <https://www.magnite.com/blog/flooring-best-practices-drive-107-revenue-lift/>.

<sup>924</sup> The ability to set granular price floors across multiple platforms with different sets of policies and rules "incentivizes pubs to call the same demand source multiple times through different channels with different floor prices (e.g. DBM is called through AdX, EB and HB with different floor prices), to effectively fish for the highest price." GOOG-DOJ-12948968, at -969. These floors were often used "in order to fool the DSP into overpaying." [REDACTED] (Google) Deposition, at 232:13-232:18.

<sup>925</sup> GOOG-DOJ-06525908, at -915-916.

<sup>926</sup> Professor Gans limits to a narrow subset of one part of the Daily Mail's ad sales. Specifically, he limits to one of Daily Mail's web properties and plots only open auction and Open Bidding ad sales in his narrow notion of display ads. Gans Report, at ¶¶521-24; Figures 19-20. Therefore, he ignores a wide variety of ways in which Daily Mail monetizes its content, even if one assumes UPR affected Daily Mail.

<sup>927</sup> Gans Report, at ¶523.

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publishers' ability to monetize their business effectively is continuously reduced, exacerbating this effect.”<sup>928</sup> These conclusions are not supported by the data or the documents.

514) As an initial matter, the data on which Professor Gans relies indicate that the Daily Mail's revenue from AdX open auctions and Open Bidding increased following implementation of UPR. While its CPM on Open Auctions fell from about [REDACTED] in January 2019 to about [REDACTED] in December 2019, its matched impressions on open auctions tripled from about [REDACTED] to about [REDACTED] over the same time, indicating an increase in Open Auction revenue following implementation of UPR.<sup>929</sup> Professor Gans ignores this, and instead speculates that the Daily Mail's “quality-adjusted revenue”<sup>930</sup> might have declined.

515) More broadly, even ignoring the potential benefits of UPR to advertisers, a snapshot of data for a single publisher consisting of less than two years (much of which overlap with the COVID-19 pandemic lockdowns) is an insufficient basis from which to infer broader harm to publishers.<sup>931</sup> For example another publisher (Scripps Network<sup>932</sup>) had a completely different experience than the Daily Mail.

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<sup>928</sup> Gans Report, at ¶523.

<sup>929</sup> Professor Gans does not present a figure showing Daily Mail's open auction and Open Bidding revenue. Data indicate that Daily Mail's revenue increased for both open auction and Open Bidding. *See* Figure 149 and Figure 150. To properly calculate the Daily Mail's open auction revenue, the CPM he reports would need to be multiplied by impressions, not matched impressions (also referred to as matched requests). (Google Ad Manager Help, “Understanding eCPM in Ad Exchange,” available at: <https://support.google.com/admanager/answer/6334268>. Accessed June 21, 2024).

<sup>930</sup> Gans Report, at ¶523.

<sup>931</sup> Professor Gans' Figure 19 shows Daily Mail's open auction CPM from 2018-2021. Professor Gans' Figure 20 shows matched impressions in AdX open auctions and matched impressions in Open Bidding during 2019.

<sup>932</sup> Internet Archive, “Overview,” available at: <https://web.archive.org/web/20190630224648/http://www.scrippsnetworksdigital.com/>. Accessed July 25, 2024.

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- a. Following UPR, Scripps Networks enjoyed an increase in open auction CPM<sup>933</sup> (rather than Daily Mail's decrease in open auction CPM<sup>934</sup>).
- b. Scripps Networks enjoyed a decrease in Open Auction matched impressions<sup>935</sup> (rather than Daily Mail's increase in open auction matched impressions<sup>936</sup>).
- c. Scripps Networks enjoyed an increase in Open Bidding matched impressions<sup>937</sup> (rather than Daily Mail's decrease in Open Bidding matched impressions<sup>938</sup>).

516) Based on these patterns, Professor Gans' logic leads to the exact opposite conclusion he states in his report: "This analysis also makes clear that [Scripps Networks] impressions were being drawn into [rival exchanges] at the expense of [AdX] due to UPR, showing the effects of this conduct on [Google's]' ability to compete."<sup>939</sup> This illustrates that different publishers have different experiences—potentially for reasons unrelated to UPR or other Google business practices. Professor Gans' analysis of Daily Mail is therefore not informative about the impact of UPR on publishers as a

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<sup>933</sup> See Figure 151.

<sup>934</sup> See Figure 152.

<sup>935</sup> See Figure 153.

<sup>936</sup> See Figure 154.

<sup>937</sup> See Figure 155.

<sup>938</sup> See Figure 156.

<sup>939</sup> Professor Gans states: "[t]his analysis also makes clear that Daily Mail's impressions were being drawn into AdX at the expense of rival exchanges due to UPR, showing the effects of this conduct on rivals' ability to compete." Gans Report, at ¶524.

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whole. Regardless, I note that, following UPR, both the Daily Mail and Scripps Network enjoyed increases in Open Auction revenues<sup>940</sup> and Open Bidding revenues.<sup>941</sup>

517) Professor Gans interprets a slide from an April 2020 Google presentation to mean that about [REDACTED] of publishers lost between [REDACTED] of their revenue from Google's shift to UFPA and UPR, implying that the majority of publishers were not harmed.<sup>942</sup> The slide shows that the shift to a first-price auction and rollout of UPR together increased the revenues earned by the median publisher, including from increases in publisher revenue from non-Google demand sources (e.g., header bidding). Expressed differently, even if one views the relevant market as one-sided (ignoring the benefits to advertisers of lower ad prices), Professor Gans' analysis indicates that the majority of publishers were not harmed from the move to UPR.

*b. Professor Gans Does Not Demonstrate Harm to Competition in His "Complementary Market" for Large Advertiser Buying Tools*

518) Professor Gans also opines that UPR harmed competition in his "complementary market" for large advertiser buying tools because it "allowed Google's ad buying tools for large advertisers (DV360) to clear more impressions at the expense of competitors."<sup>943</sup> Professor Gans does not define a

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<sup>940</sup> For Scripps Network, see Figure 157. For the Daily Mail see Figure 149.

<sup>941</sup> For Scripps Network, see Figure 158. For the Daily Mail see Figure 150.

<sup>942</sup> Gans Report, at ¶¶517-518 and Figure 17. ("An April 2020 presentation (Figure 17) looking back at the 2019 product launch reviewed the rollout of the first-price auction. The document mentions that "pubs made more money"; however, this conclusion is misleading. The conclusion that "Pubs made more money" is misleading as the graph showing the percentage revenue change in total revenue for the top 500 publishers indicates that a large portion of publishers has a negative percentage change. From the graph, once [sic] can see that more than [REDACTED].").

<sup>943</sup> Gans Report, at ¶500.

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relevant antitrust market for large advertiser buying tools.<sup>944</sup> Professor Gans conducts no analysis whatsoever to demonstrate that such an antitrust market exists, or that Google has monopoly power in such a market. Indeed, Plaintiffs' complaint does not allege Google has monopoly power or market power in the alleged large advertiser buying tool market.<sup>945</sup> Therefore, Professor Gans has not established that UPR or any Google or any other actor could harm competition in that market, as he asserts, because he has not shown that large advertisers cannot readily substitute away from large buying tools to defeat a price increase. Regardless, Professor Gans has provided no evidence that prices increased, output or quality fell, or that rival providers of large advertiser buying tools were harmed by UPR. To the contrary, data indicate that the fees on DV360 have been declining over time, undermining Professor Gans' conclusion that UPR harmed competition in his candidate market for large advertiser buying tools.<sup>946</sup>

*c. Professor Gans Does Not Demonstrate Harm to Rival Ad Exchanges*

519) Professor Gans asserts that UPR harmed competition in his candidate ad exchange market because UPR "reduc[ed] price floors set by publishers" which "drove transaction volumes to Google's own products and harmed third-party rivals."<sup>947</sup> However, harm to rivals does not equal harm to

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<sup>944</sup> Professor Gans does not establish that there is a relevant antitrust market for large advertiser buying tools. He merely asserts that there is a "complementary market for large advertising tools." *See also* Gans Report, at ¶288. ("Based on the same approaches (e.g., *Brown Shoe* and *HMT*) and for the same reasons that I evaluated above to find a relevant market for ad buying tools for small advertisers for the buying of open web display advertising space, I also find a complementary market for large advertising tools purchasing open web display advertising.").

<sup>945</sup> Fourth Amended Complaint, at ¶17.

<sup>946</sup> *See* Exhibit 2

<sup>947</sup> Gans Report, at ¶497; *see also* Gans Report, at ¶544 ("To conclude, UPR took place in Google's ad server. UPR harmed competition in the ad exchange market by giving AdX an advantage over third-party exchanges through lower floors and enabling AdX and Google's ad buying tools (DV360 in particular) to transact more impressions at the expense of third-party tools.").

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competition.<sup>948</sup> Even if UPR resulted in more transactions through Google's ad exchange and ad buying tools, this is consistent with competition on the merits and does not establish harm to competition.

520) Professor Gans has not established that UPR reduced total market output and/or increased market prices in his candidate market relative to levels that would have prevailed "but-for" the implementation of UPR. As discussed below, it would be unlikely for the volume of ads lost by third-party exchanges under Plaintiffs' theory of UPR to have any meaningful impact on the viability of those exchanges or otherwise to reduce their capacity to exert competitive pressure on Google. Data are consistent with this intuition: there is no evidence that UPR restricted market-wide output or quality, diminished competitor viability, or resulted in increased prices paid by advertisers or publishers.

i. No Evidence that UPR Restricted Market-Wide Output or Diminished Competitor Viability

521) As Exhibit 28 shows, there was no market-wide restriction in output<sup>949</sup> stemming from UPR, regardless of whether one includes house ads (which do not generate ad revenue) or excludes house ads.<sup>950</sup> The patterns observed in the data are consistent with documents and suggest that the overall effect

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<sup>948</sup> B. Douglas Bernheim and Randal Heeb, "A Framework for the Economic Analysis of Exclusionary Conduct," The Oxford Handbook of International Antitrust Economics, Vol. 2, Eds. Roger D. Blair and D. Daniel Sokol, Oxford: Oxford University Press, Chapter 1, 2005, at p. 28.

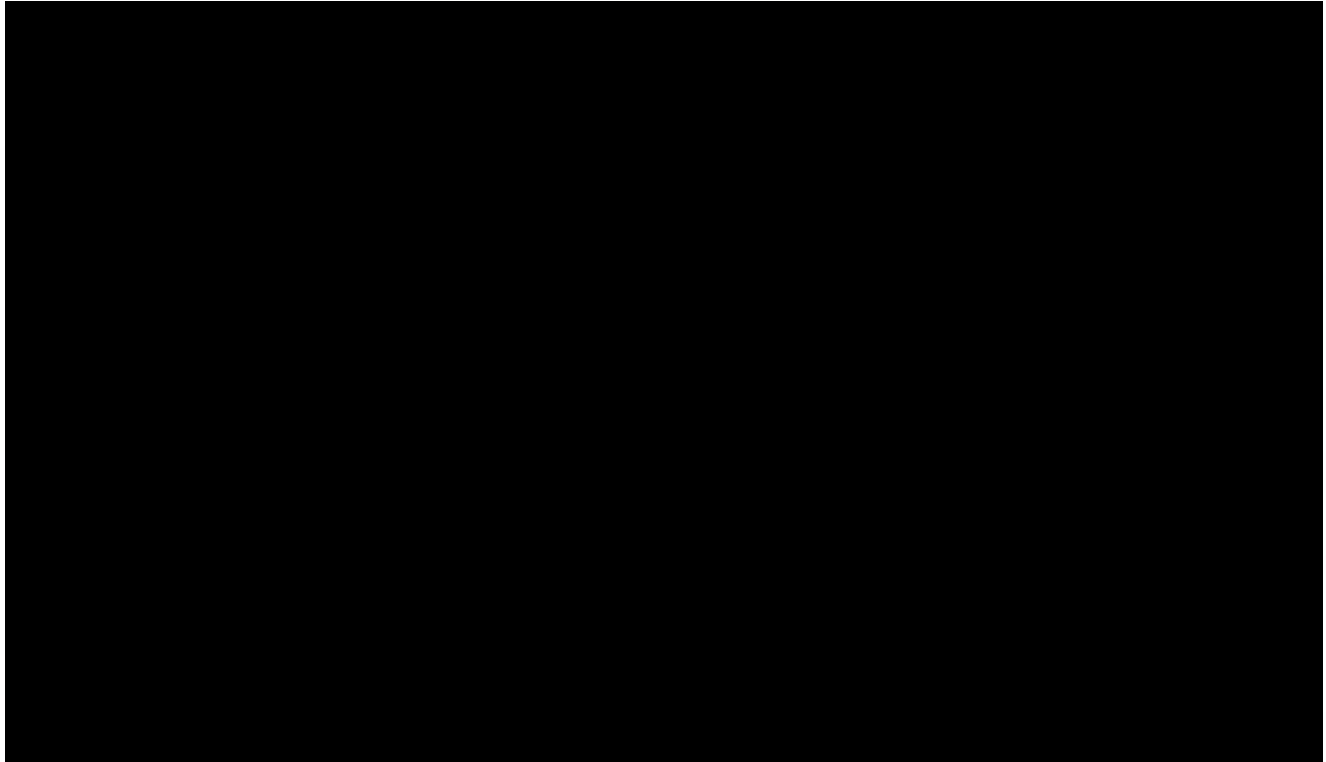
<sup>949</sup> As I have noted, Professor Gans' methodology for calculating Google's market share in his candidate ad exchange market assumes that DFP has a 100% share of display ad impressions. Purely for the purpose of rebutting Professor Gans' assertions that UPR harmed competition in his candidate markets, my discussion in this section assumes Professor Gans is correct that Google's DFP has a high market share in his candidate ad server market, so that one may use the total number of (narrow) display ad impressions served by DFP (AdX – Google Ads, AdX – DV360, AdX – Real Time Bidders, Open Bidding, and Header Bidding in the exhibit) as a proxy for total output in his candidate markets. This biases results towards finding antitrust harm because Professor Gans' narrow definition of display ads ignores the growing trend by users toward mobile apps, social media, video, and walled garden platforms that could result in a decline in narrow display ad impressions served on DFP for reasons unrelated to Google's business practices.

<sup>950</sup> See also Exhibit 11. I utilized Professor Gans' approach to identifying Google Ads and DV360 ad spend through AdX (Gans Report, at ¶820, fn. 1051). I note that in 2013 through 2016, Professor Gans' methodology appears to exclude a small amount of DV360 ad spend on AdX where it is recorded through the final\_buyer\_network\_id field.

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of the move to UFPA and UPR was to increase output in the candidate market for ad exchanges rather than decrease output by foreclosing competition.

**Exhibit 28**



Notes: The dotted shading on DFP and AdSense impressions respectively indicates limited availability of precise mobile app indicators in the DFP Reservations data and of precise ad format indicators in the AdSense backfill data. Header bidding data are not available in DFP Reservations data prior to June 2018. "House Ads" includes only impressions outside header bidding. "DFP - Other" encompasses impressions in DFP that are not house ads, direct deals, or header bidding transactions.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

522) Additionally, data do not indicate that UPR undermined competition from third-party ad exchanges:

- a. **AdX – Real Time Bidders.** Data show that impressions won on AdX by RTB bidders other than Google Ads and DV360 remained relatively flat and possibly increased in the

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months immediately before and after UPR.<sup>951</sup> These data are inconsistent with UPR impacting aggregated impressions through RTB bidders.

- b. **Header Bidding.** Data indicate that the volume of header bidding impressions rivals those of Google Ads and increased steadily both before and after UPR.<sup>952</sup> These data are inconsistent with UPR having an adverse effect on header bidding.
- c. **Open Bidding.** While there was a modest decline in the volume of impressions won through Open Bidding following implementation of UPR,<sup>953</sup> the magnitude of the decrease does not support the theory that UPR deprived rivals of significant volumes. Because the exchanges that participate in Open Bidding are also those that participate in header bidding, the growth in header bidding from nearly [REDACTED] impressions per month in June 2018 to over [REDACTED] impressions in February 2023 far exceeds the modest [REDACTED] impression decrease in Open Bidding.<sup>954</sup> These data are inconsistent with rivals having been deprived of scale or otherwise diminish their ability to compete.

523) Finally, even looking through the narrow lens of Google's own sell side data, UPR did not preclude other exchanges from winning impressions through header bidding and Open Bidding. Data show GAM serving a consistent [REDACTED] percent to [REDACTED] percent share of these impressions since June 2018—

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<sup>951</sup> See Figure 133.

<sup>952</sup> See Figure 134. Information on header bidding impressions in Google data begin June 2018.

<sup>953</sup> See Figure 133.

<sup>954</sup> See Figure 134. Information on header bidding impressions in Google data begin June 2018.



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both before and after the implementation of UPR.<sup>955</sup> Significantly, data show that once Real Time Bidders are taken into consideration, during that same period the share of exchange impressions transacted by Google Ads and DV360 via AdX in Google sell side data was also relatively stable and often fell below █ percent—a pattern inconsistent with UPR diminishing third-party ad exchanges' ability to compete.<sup>956</sup> Expanding to look at all impressions served through DFP excluding house ads as data show the share served through AdX by Google's buying tools on average remained stable below █ percent.<sup>957</sup>

ii. No Evidence that UPR Resulted in Increased Prices

524) There is no evidence that UPR resulted in higher prices for publishers, which would be anticipated if UPR reduced competition.<sup>958</sup> The price that Google charges publishers in the candidate market for exchanges—the AdX revenue share—has been flat or decreasing over time,<sup>959</sup> as have prices for DV360 in the candidate large advertiser buying tool market.<sup>960</sup>

525) Additionally, Google documents describe the internal processes for setting up contracts with publishers with discounted pricing.<sup>961</sup> Internal analyses of discounting on AdX and Google Ad Manager

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<sup>955</sup> See Figure 159.

<sup>956</sup> See Figure 160.

<sup>957</sup> See Figure 161.

<sup>958</sup> Economic theory indicates that, when output expands and quality increases, prices may also increase. The results I describe are consistent with procompetitive expansions in output and increases in quality arising from UPR. Therefore, observing that prices increased in Plaintiffs' candidate relevant markets as a result of UPR would not, as a matter of economics, necessarily equate to anticompetitive harm from UPR. On the other hand, if UPR resulted in flat or decreasing prices in Plaintiffs' candidate relevant markets then, taken together with the above results, this would suggest that UPR was unambiguously procompetitive.

<sup>959</sup> See, e.g., Exhibit 18.

<sup>960</sup> See Exhibit 2

<sup>961</sup> See, e.g., GOOG-DOJ-AT-01128809, at -870, -880-881 ("Work with your Platform POC to obtain approval for discount before offering any discount to a partner.").

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indicate that discounting has resulted in “a declining trend in effective Google revenue shares across [Private Auction] and [Programmatic Direct] over time.”<sup>962</sup>

526) In sum, the documentary record describing increased discounting over time and data indicating flat to declining DV360 and AdX average fees are broadly inconsistent with Professor Gans’ claims that UPR harmed competition with regard to large advertiser buying tools or ad exchanges, and Professor Gans has made no attempt to demonstrate that DV360 or ad exchange fees would have been even lower but for the imposition of UPR.

**B. Dynamic Allocation and Enhanced Dynamic Allocation Had A Legitimate Business Rationale and Did Not Harm Competition**

527) The opinions of Professor Gans, Professor Weinberg, and Professor Pathak regarding the competitive effects of Dynamic Allocation (DA) and Enhanced Dynamic Allocation (EDA) are not supported by the data or the documents.<sup>963</sup>

***1. Background on Dynamic Allocation (DA) and Enhanced Dynamic Allocation (EDA)***

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<sup>962</sup> GOOG-DOJ-AT-01978287, at-287-306.

<sup>963</sup> Professor Gans asserts that DA and EDA harmed competition in his narrow candidate ad exchange market. In particular, Professor Gans asserts that under DA, “AdX was afforded a right of first refusal on publisher’s non-guaranteed inventory” and that EDA “extend[ed] AdX’s right of first refusal to direct deals.” (Gans Report, at ¶548). He concludes that “[t]he antitrust harm arising from these actions has the same economic structure as the harm identified with respect to UPR” because “had Google not been vertically integrated into the exchange market, it would not have had the incentive to use its market power in the ad server market to steer transactions towards its own ad exchange, AdX.” (Gans Report, at ¶550). Professor Pathak alleges that EDA “diminished publishers’ ability to be selective with demand sources and publishers had to allow for the possibility of AdX serving lower-quality ad impressions for their most premium inventory.” (Pathak Report, at ¶173). Professor Weinberg claims that Dynamic Allocation led to higher win rate and higher revenue for AdX as well as lower win rate and lower revenue for non-Google exchanges. Additionally, if AdX typically transacts ads of lower quality than non-Google exchanges, Dynamic Allocation also led to an increase in the display of lower quality ads.” (Weinberg Report, at ¶120). Professor Weinberg also alleges that “Enhanced Dynamic Allocation likely led to an increase in win rate and increase in revenue for AdX and reduced the value of direct deals for advertisers, which would in turn decrease the revenue earned by publishers via direct deals.” (Weinberg Report, at ¶137).

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528) Dynamic Allocation (DA) was an innovation that allowed a publisher to get real-time bids from AdX and, if higher than the anticipated value attributed to the publisher's indirect programmatic demand sources, serve the AdX advertisement.<sup>964</sup>

529) Prior to Google's acquisition of DoubleClick and through at least July of 2007, DFP publishers called indirect programmatic demand sources using a so-called waterfall mechanism.<sup>965</sup> DA was incorporated into the DFP product prior to its acquisition by Google and changed the way DFP sourced ads for remnant inventory.<sup>966</sup> Under DA, DFP calculated a "floor price" for each inventory item that was equal to the publisher's highest value CPM (vCPM) across all of its demand sources.<sup>967</sup> DFP then sought a bid from AdX, which ran a real-time auction. If AdX returned a CPM above the floor price, then the AdX ad would be served.<sup>968</sup> If AdX returned a CPM below the floor price, then the best

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<sup>964</sup> Google Ad Manager Help, "Ad competition with dynamic allocation," available at: <https://support.google.com/admanager/answer/3721872?hl=en>. Accessed April 1, 2024.

<sup>965</sup> When a remnant impression became available under the waterfall, publishers specified an order for each demand source to be called and a reserve price, termed the "vCPM," for each demand source. Publishers could enter any value for the vCPM, but Google suggested that publishers use the historical average CPMs, which is information the publisher could access through DFP on a per-line item basis. Publishers could set a higher reserve price if an ad network tended to serve lower quality ads, or a lower reserve price if the publisher had a negotiated relationship with a particular demand source. Publishers could set both the reserve prices and the order on an individual impression basis. DFP "ranks all eligible remnant line items [...] by their value CPM" which is a value that publishers can enter when they set up their line items. *See* Google Ad Manager Help, "Line item types and priorities," available at: <https://support.google.com/admanager/answer/177279>. Accessed April 1, 2024.

DFP called demand sources for bids according to the publisher's order, and DFP served the ad of the first demand source that was willing to pay more than its reserve price. When AdX was called in the waterfall, it conducted a live auction and returned the winning CPM to DFP (less the exchange fee), but the other exchanges and ad networks returned static bids, or bids based on set parameters defined by advertisers. (Declaration of Nitish Korula on August 4, 2023 (GOOG-AT-MDL-008842393, at ¶¶10, 12).

<sup>966</sup> GOOG-TEX-00722592, at -626 (showing "dynamic allocation of inventory" as a part of the DoubleClick Marketplace - Ad Exchange); GOOG-TEX-00439764, at -764 ("Key features and benefits of the feature include: ... Dynamic Allocation. Publishers simply specify the areas of their inventory open for competition and for every impression delivered, the booked rate will be compared to the best bid available from the AdSense system. AdSense will only be delivered if the net eCPM for the publisher is higher than the rate booked in DFP."); GOOG-TEX-01243467, at -467 ("This feature adds an Admob line item type that lets publishers use Dynamic Allocation when backfilling app inventory to Admob").

<sup>967</sup> Declaration of Nitish Korula on August 4, 2023, at ¶¶10-11.

<sup>968</sup> Prior to September 2019 when AdX was operating second-price auctions, AdX submitted the second highest AdX bid (less the exchange fee) to DFP. After AdX switched to a first-price auction in September 2019, AdX submitted the highest bid (less the exchange fee) to DFP. *See* GOOG-DOJ-06525908, at -912-913.

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remnant line item would be selected to serve to the impression; if the demand source corresponding to this line item did not have an ad to serve, then DFP requested bids from other demand sources sequentially and served the ad of the first demand source that returned a CPM above its own reserve price.<sup>969</sup> This process ensured that AdX transacted impressions under DA only if it was able to provide the publisher with revenue larger than the expected revenue from the waterfall, which was often based on historical averages.<sup>970</sup>

530) Enhanced Dynamic Allocation (EDA) was an innovation introduced into Google's ad server that allowed publishers to fulfill their commitments on guaranteed ad inventory while allowing programmatic ads bidding at high prices to serve before all guaranteed deals have been fulfilled.<sup>971</sup> When EDA was introduced in 2014, DFP was using DA to seek competitive bids only for remnant inventory. EDA built on DA to enable indirect demand in DFP to compete for guaranteed inventory.<sup>972</sup> Google

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<sup>969</sup> Just as in the waterfall, publishers were able to specify the order for DFP to call each demand source in the sequential process, and they could use historical CPMs to ensure that higher value demand sources were higher in the order. (Internet Archive, "DFP and dynamic allocation," available at: [https://web.archive.org/web/20140916152734/https://support.google.com/dfp\\_premium/answer/3447903](https://web.archive.org/web/20140916152734/https://support.google.com/dfp_premium/answer/3447903). Accessed April 5, 2024.)

<sup>970</sup> Alise Zaiceva, "Header bidding vs waterfall differences explained," Setupad, available at: <https://setupad.com/blog/header-bidding-vs-waterfall/>. Accessed July 31, 2024. ("In programmatic waterfall, SSPs/ad networks are ranked based on the average historical performance they have produced for the publisher. This means that SSPs/ad networks with the best record of eCPM, fill rate, latency, etc., will be at the top. The impressions are then passed from one SSP/ad network to another until they're sold."). To illustrate DA, consider how DFP would handle the ad inventory of a publisher with a single placement that gets an average of 1,000 impressions per day. As the publisher receives impressions, DFP would first serve guaranteed ads. If the publisher has a direct agreement with an advertiser to display an ad 600 times per day, then DFP would serve the guaranteed ad to the first 600 impressions at the agreed-upon price. As each of the remaining 400 impressions becomes available, DFP would use DA to source an ad, first requesting a bid from AdX and remnant line items, then turning to the other demand sources sequentially if the highest bid from AdX and remnant line items did not exceed the floor price for the impression. See Google Ad Manager Help, "Line item types and priorities," available at: <https://support.google.com/admanager/answer/177279>. Accessed April 1, 2024.

<sup>971</sup> GOOG-DOJ-06885161, at -161 ("Enhanced Dynamic Allocation[:] ... Generally availability roll-out began on 3/3/2014... Enhanced Dynamic Allocation (formerly called "Cross-Priority Ranking," CPR) introduces competition between reservations and AdX by allowing AdX (or AdSense) to bid on high priority DFP impressions (any goal-based ad in the reservation priorities) without compromising reservation goals. It calls AdX for every reservation impression and uses the reserve price to control how often we expect AdX to fill the impression. When a reservation ad is further behind, the reserve price will be higher.").

<sup>972</sup> GOOG-DOJ-06885161, at -161 ("Enhanced Dynamic Allocation[:] ... Generally availability roll-out began on 3/3/2014... Enhanced Dynamic Allocation (formerly called "Cross-Priority Ranking," CPR) introduces competition between reservations and AdX

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described EDA as being “designed to increase [publishers’] Ad Exchange revenue without compromising reservations.”<sup>973</sup>

531) Under EDA, DFP seeks a competitive bid from AdX for remnant *and* guaranteed impressions. DFP serves the AdX ad if it is in the publisher’s best interest given: (i) the impression’s value on the exchange and (ii) the likelihood that the impression is needed to meet a guarantee. EDA achieves this by calculating a dynamic reserve price (the “EDA price”) for each impression and serving exchange ads only if the winning bid in AdX exceeds both the floor price (defined as under DA based on the vCPMs of other remnant line items) and the EDA price.<sup>974</sup>

532) Under EDA, guaranteed impressions are not made available only to AdX, as Plaintiffs allege when they write that EDA “gave Google access to a new pool of premium ad inventory and walled off rival buyers from that pool.”<sup>975</sup> Specifically, under EDA, GAM looks at AdX *and* remnant line items eligible to serve the same impressions, and AdX transacts the impression only if its high bid exceeds

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by allowing AdX (or AdSense) to bid on high priority DFP impressions (any goal-based ad in the reservation priorities) without compromising reservation goals. It calls AdX for every reservation impression and uses the reserve price to control how often we expect AdX to fill the impression. When a reservation ad is further behind, the reserve price will be higher.”)

<sup>973</sup> GOOG-DOJ-15417688, at -691-692.

<sup>974</sup> The EDA price is based on the historical distribution of winning bids for eligible impressions in AdX. If the ad is on track to satisfy the guarantee, the EDA price takes a value that is lower in the distribution of historical bids. If the ad is not on track to satisfy the guarantee, the EDA price takes a value that is higher in the same distribution. The EDA price is (generally) set equal to the percentile of the distribution of historical winning bids. The EDA price is calculated as P times the 100th percentile of the distribution of winning AdX bids, where P is the fraction of the remaining impressions that are required to meet the guarantee. If 90 percent of remaining impressions are needed to meet the guarantee, then the EDA price is set equal to the 90th percentile of the AdX bid distribution. This ensures the AdX bid exceeds the price only 10 percent of the time and the guaranteed ad is served 90 percent of the time. That is, the higher the fraction of the remaining impressions that are needed to meet the guarantee, the higher the AdX price that is required for it to serve ahead of a guaranteed ad. *See* GOOG-TEX-00158694.

<sup>975</sup> Fourth Amended Complaint, at ¶20. *See* Gans Report, at ¶630 (“AdX was given the ability to use the highest valued line item price as its reserve price, and transact the impression if it can beat this reserve price. No other exchange has this ability.”).

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both the EDA price and the highest vCPM for other remnant line items.<sup>976</sup> The highest vCPM remnant line item—which could be, for example, the highest bid from header bidding passed to the DFP server in real-time—would win the impression if it is higher than both the EDA price and the highest bid in AdX.<sup>977</sup> If neither AdX nor the highest vCPM remnant line item can beat the EDA price, GAM will fill the impression with the guaranteed line item.

533) The EDA price was designed to increase publisher revenue—allowing publishers to benefit from the demand source with the highest value (i.e., the highest of the winning AdX bid, vCPM of other remnant line items, or EDA price for the guaranteed line item)<sup>978</sup>—while ensuring that guarantees were met.<sup>979</sup>

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<sup>976</sup> Declaration of Nitish Korula, August 4, 2023 (GOOG-AT-MDL-008842393, at ¶14). (“Up until at least December 2021, the winning bid from the Header Bidding auction was typically used to trigger a specific line item that the publisher had booked within Google’s ad server (most commonly a remnant line item), and as described above in paragraph 11, the Value CPM of that line item could represent the winning Header Bidding bid as a floor in the AdX auction (prior to September 2019) or as a competing bid in the Unified First Price Auction (from September 2019 onwards).”).

<sup>977</sup> For example, Google Ad Manager indicates that “[d]ynamic allocation allows all non-guaranteed demand—Open Auction, Open Bidding, and remnant line items—to compete in real time with guaranteed demand ... If a guaranteed (Standard or Sponsorship) line item is eligible for an impression, in competition with Open Auction or remnant line items: The guaranteed line item competes using a temporary CPM or ‘opportunity cost’ that Ad Manager calculates automatically. Open Auction or a remnant line item serves if they pay more than the opportunity cost of not serving the guaranteed line item.” (Google Ad Manager Help, “Ad competition with dynamic allocation,” available at: <https://support.google.com/admanager/answer/3721872?hl=en>. Accessed April 1, 2024).

<sup>978</sup> Plaintiffs assert that the impressions won by AdX through EDA are “publishers’ most high-value impressions.” (*See, e.g.*, Fourth Amended Complaint, at ¶284.) While EDA does ensure that AdX serves when AdX bidders value the impression highly, this need not mean that they are the “most high-value impression” to advertisers who engage in direct deals with publishers. Indeed, advertisers can specify which impressions they value most through targeting and be assured of reaching their targeted impressions even with EDA running. *See also* Gans Report, at ¶631 (“AdX revenue...increases because (a) it transacts more impressions, and (b) these new impressions are relatively high valued and expensive.”).

<sup>979</sup> GOOG-DOJ-13284614, at -614. (“We have implemented, in experiment, a ‘cross-priority’ algorithm that respects reservation contracts while considering high quality remnant or AdX ads for ad selection in premium/reserved priority bands. We trade off the priority and schedule of the high priority ad with the revenue we can expect to get from calling for an ad from AdX. The reserve price for the AdX call should be the maximum of the ‘opportunity cost’ of serving the reserved ad and the maximum CPM from other remnant options (ie. AdSense).”) The OPC update to EDA provided publishers further opportunity to increase revenue by accepting a slight increase in risk of under-delivery on guaranteed deals.

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534) Google's rivals have also implemented optimizations or features that implement ad selection logic that follows the same high-level approach of allowing (indirect) programmatic ads that bid at high prices to serve before guaranteed deals. The documentary record and public information indicates that at least five other publisher ad servers other than Google have implemented optimizations or features like EDA.<sup>980</sup>

**2. Plaintiffs' Experts Fail to Demonstrate DA or EDA Harmed Competition**

535) Plaintiffs' experts have not demonstrated that DA or EDA harmed competition in any of the candidate relevant markets that Professor Gans asserts, either through foreclosure of rivals, or through lower output, higher price, or lower quality. Plaintiffs' experts did not provide any evidence for any of these potential anticompetitive effects.

536) Professor Gans' conclusions are based solely on his interpretation of Google documents. In particular, Professor Gans wrongly interprets Google's economic incentive to win more business as evidence of "anticompetitive steering" of impressions to AdX. However, an incentive to win more transactions and grow revenue is insufficient to support a conclusion of anticompetitive conduct. A

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[REDACTED] Magnite (Refinitiv Streetevents, "Edited Transcript: Q2 2021 Magnite Inc Earnings Call," available at: <https://investor.magnite.com/static-files/950ded3e-8953-4cf9-a043-d0e72b1fb856>, at p. 4. Accessed April 4, 2024 ("Having a tightly integrated ad server allows for the dynamic allocation of programmatic and nonprogrammatic inventory to provide a holistic yield management solution for publishers.")); OpenX (OpenX, "OpenX Transforms Concept of SSP with Industry-First Demand Fusion Technology," available at: <https://www.openx.com/press-releases/openx-transforms-concept-of-ssp-with-industry-first-demand-fusion-technology/>. Accessed April 4, 2024); and FreeWheel (Ben Munson, "Comcast's FreeWheel launches unified ad decisioning," StreamTV Insider, April 15, 2020, available at: <https://www.streamtvinsider.com/tech/comcast-s-freewheel-launches-unified-ad-decisioning> ("By incorporating FreeWheel's unified decisioning into One Platform, we're now able to combine direct sold and programmatic capabilities into one, making it even easier for clients to access all of our premium video inventory in whatever way works best for their business while allowing us to continue to improve the consumer experience.")) (internal quotations omitted).



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firm's win rate and revenue may increase for procompetitive reasons—e.g., by delivering benefits to customers—and Professor Gans makes no attempt to distinguish between effects of procompetitive and anticompetitive business practices in his analysis of AdX revenue and win rates.

537) To the contrary, Professor Gans appears to agree that DA and EDA were procompetitive innovations, conceding that “[w]hen initially implemented, . . . [DA] represented an improvement over previous sequential processes by which the ad server called ad networks”<sup>981</sup> and that EDA benefits both advertisers<sup>982</sup> and publishers.<sup>983</sup>

538) The conclusions of Plaintiffs’ experts that DA and EDA were anticompetitive are not only speculative; they are undermined by trends observed in output, prices, quality and competition discussed in Sections V.F, IX.B, and IX.C. As demonstrated below, there are many procompetitive reasons why a firm’s win rate and revenue may increase, including its delivery of benefits to its customers. The data are inconsistent with Plaintiffs’ claim that DA and EDA harmed competition.<sup>984</sup> Plaintiffs’ experts do not provide any evidence or analysis in support of the conclusion that DA or EDA—which Professor

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<sup>981</sup> Gans Report, at ¶547.

<sup>982</sup> Gans Report, at ¶632 (“Without EDA, advertisers need to purchase high-value line items in bulk via direct deals, meaning they have to make commitments to buy high-value impressions at a large scale. This is both an expensive and a time-consuming task that is not viable for many advertisers, especially small ones. With EDA, they can purchase these impressions one at a time, allowing them greater flexibility.”).

<sup>983</sup> Gans Report, at ¶630 (“EDA enables AdX (and only AdX) to transact impressions that would have been allocated to direct deals if it results in a higher clearing price.”). Note that Professor Gans’ claim that EDA enables only AdX to transact such impressions is false, as discussed in Section XI.B.1.

<sup>984</sup> These findings are consistent with analyses conducted by Professor Milgrom indicating that advertisers and publishers benefited from DA and EDA. Milgrom Report, at ¶¶268-292; 327-332. If, as Professor Milgrom concludes, DA and EDA provided benefits to advertisers and publishers, one would expect this to attract additional advertisers and publishers to AdX. These additions would further improve customer welfare, thanks to beneficial indirect network effects.



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Gans acknowledges provide value to customers<sup>985</sup>—amounted to “anticompetitive steering” as opposed to competition on the merits.

**3. DA and EDA Were Procompetitive Innovations that Benefited Publishers and Advertisers and Expanded Opportunities for AdX to Compete on the Merits**

539) To the extent that DA and EDA expanded opportunities for AdX to compete on the merits by providing publishers with higher revenue without compromising their direct deals with advertisers and by providing advertisers with opportunities to be matched more efficiently with the users they seek, competition is enhanced by these innovations. The analyses conducted by Professor Milgrom, as well as documents in the record, are consistent with these procompetitive outcomes. Therefore, if DA and EDA attracted more ad spend from advertisers and won more ad space from publishers, it is likely that such growth of Google’s ad tech stems from the superior quality that these innovations offer AdX’s customers, rather than the anticompetitive theories that Plaintiffs’ experts assert.

540) It is my understanding that Professor Milgrom has evaluated Google’s DA and EDA business practices in the context of auction efficiency. Concerning DA, he concludes that it: (a) benefited publishers by allowing them to sell impressions to AdX when the AdX price was larger than the expected revenue from any other demand source and was a “risk-free improvement in their expected revenue,” (b) increased publisher revenue and reduced unsold impressions relative to the waterfall, (c) benefited advertisers by allowing them to pay only the amount needed to win impressions, (d) provided AdX the

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<sup>985</sup> Gans Report, at ¶632 (“In the long run, AdX’s unique ability to trade high-value impressions makes it more appealing to advertisers compared to other exchanges. Without EDA, advertisers need to purchase high-value line items in bulk via direct deals, meaning they have to make commitments to buy high-value impressions at a large scale. This is both an expensive and a time-consuming task that is not viable for many advertisers, especially small ones. With EDA, they can purchase these impressions one at a time, allowing them greater flexibility.”).

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opportunity to win impressions through competition on the merits (higher revenue), and (e) was not strictly limited to Google as other companies developed ad allocation mechanisms similar to DA (OpenX, [REDACTED])<sup>986</sup> Professor Milgrom similarly concludes that EDA: (a) benefited publishers by increasing publisher revenue without compromising direct deals, (b) increased auction efficiency by reducing the number of unsold impressions and allocated impressions to remnant bidders with the highest values, (c) benefited remnant demand advertisers who won the impressions they valued most, (d) benefited third-party exchanges by making guaranteed impressions available to them, (e) did not rely on scale, (f) was similarly implemented by other companies ([REDACTED], Comcast's FreeWheel, OpenX, and [REDACTED]) and (g) did not result in direct advertisers being allocated lower quality impressions.<sup>987</sup> Professor Milgrom also indicates that EDA's better matching would also improve experiences for end users, and likely increase the surplus of advertisers.<sup>988</sup>

541) Documents in the record are also consistent with DA being a procompetitive innovation. Internal studies on DA are consistent with Professor Milgrom's conclusions and indicate that DA had a positive impact on publishers' revenue. For instance:

- A 2010 experiment conducted by Google found that DA benefited publishers, resulting in an approximate 190 percent increase in revenue from the sales of remnant ad impressions via AdX,

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<sup>986</sup> Milgrom Report, at ¶ [REDACTED], 299.

<sup>987</sup> Milgrom Report, at ¶¶ 328, 327-332.

<sup>988</sup> Milgrom Report, at ¶ 322.

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compared to the sales of such impressions without DA.<sup>989</sup> Based on the results of the experiment, DA increased revenue per publisher by [REDACTED].<sup>990</sup>

- In 2013, Google estimated that DA increased publisher revenues by more than [REDACTED] on each winning remnant ad impression over an alternative remnant demand source, resulting in an increase in publisher revenues of [REDACTED].<sup>991</sup>
- A June 2014 presentation on DA to the Ad Exchange Academy states that “[g]lobally, the Ad Exchange beats competing direct and indirect sales channels including other networks and backfills [REDACTED] of the time.” The presenter states that “when the Ad Exchange won out over the alternatives,” it achieved a revenue that was “on average [REDACTED] higher than it would have been if the Ad Exchange [had] not been used” and “[t]his translates to an average overall revenue lift of 25%.”<sup>992</sup>

542) Further, internal studies conducted before and following the launch of EDA are consistent with Professor Milgrom’s conclusions and indicate that EDA had an immediate bottom-line benefit for publishers and are consistent with EDA being a procompetitive innovation. For example:

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<sup>989</sup> White Paper, “DoubleClick Ad Exchange Impact” (2010), GOOG-DOJ-13247322, at -322 (“The results of our research showed that when DoubleClick Ad Exchange wins the auction, publishers generate [REDACTED] more revenue, on average, net of revenue sharing and ad serving fees, compared with fixed upfront sales of non-guaranteed display advertising.”).

<sup>990</sup> White Paper, “DoubleClick Ad Exchange Impact” (2010), GOOG-DOJ-13247322, at -322 (“Across all pre-emptible inventory, including those instances when the Ad Exchange did not win the auction, the revenue lift for publishers averaged [REDACTED]”).

<sup>991</sup> Presentation, “Ad Exchange Dynamic Allocation” (Sep. 05, 2013), GOOG-TEX-00054839, at -844 (“In these instances when the Ad Exchange won out over the alternatives, the revenue it achieved for that inventory was on average [REDACTED] higher than it would have been if the Ad Exchange not been used. This translates to an average overall revenue lift of [REDACTED]”).

<sup>992</sup> GOOG-DOJ-11689991, at -017.

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- An internal memo on EDA describes an offline experiment that was conducted prior to the rollout of EDA in 2014. The experiment involved simulating outcomes for four publishers under EDA. The experiment found that EDA resulted in AdX revenue per impression increasing by between [REDACTED] and [REDACTED].<sup>993</sup> Because the AdX revenue share is a percentage of gross revenue, these increases also translate to higher prices received by publishers.
- A 2013 presentation displays the results of an early experiment involving 15 publishers. In the experiment, EDA resulted in an average revenue lift of [REDACTED].<sup>994</sup>
- A November 2017 communications document about the EDA roll-out described early results based on a sample of “~2500 S[mall] B[usiness] pub[lisher]s.” This study finds that publishers typically saw a [REDACTED] revenue per thousand impression (RPM) increase from EDA and that some ad units saw as much as a [REDACTED] increase.<sup>995</sup>

543) From the standpoint of market impact, DA and EDA would have permitted Google to attract more customers as a result of competition on the merits. My review of the record, as well as Professor Milgrom’s conclusions regarding expected benefits to publishers, users and advertisers, indicate that these innovations would have likely made Google more attractive to publishers and advertisers, resulting in Google potentially attracting publishers from rivals simply because of the better value proposition. Because publishers could fulfill the terms of their direct deals with advertisers while selling ad space to

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<sup>993</sup> GOOG-DOJ-13284614, at -614 (“When using cross-priority ranking we also see increased AdX revenue per impression of between [REDACTED] possibly due to higher quality inventory becoming available for sale in the auction.”).

<sup>994</sup> GOOG-DOJ-13197448, at -483 (“Revenue [l]ift [is equal to the] [w]eighted [a]verage eCPM [l]ift: + [REDACTED]”).

<sup>995</sup> GOOG-DOJ-06885161, at -164.

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advertisers as opportunities arise throughout the month, publishers would naturally be attracted to Google by the higher revenues they could earn on AdX. Internet users, who benefit from more relevant ads and publishers' increased incentives to invest in content as result of higher revenues, would also tend to consume more content from publishers that sell ads through AdX. This naturally makes AdX more attractive to advertisers. Owing to reinforcing indirect network effects, therefore, DA and EDA likely grew the entire "pie" from which all sides of Google's integrated multi-sided platform benefited.

544) For these reasons, it is my opinion that DA and EDA were procompetitive.

***4. Data and Documents Are Inconsistent with DA and EDA Causing Anticompetitive Harm***

545) Documents and data are inconsistent with Plaintiffs' experts' unsupported assertions that DA and EDA caused anticompetitive harm. The record does not suggest that these innovations diminished the ability of other exchanges to compete on the merits. Publishers using DFP could and did sell inventory via other ad exchanges, including through remnant line items, header bidding (via remnant line items), and Open Bidding. If a publisher preferred a non-AdX demand source, the publisher could preference that demand source by setting a high corresponding vCPM—and therefore a high price floor for AdX to beat to win an impression—making it less likely that an AdX bid would be high enough to win an impression instead of that demand source.<sup>996</sup>

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<sup>996</sup> Professor Weinberg apparently agrees that publishers may engage in strategies to adjust vCPM to alter the probability that non-AdX sources can be served ahead of AdX under Dynamic Allocation, but claims the effects depend upon the sophistication of publishers (Weinberg Report, at ¶129, fn. 165 ("The impact of Dynamic Allocation with sophisticated publishers who cleverly set Value CPMs is less clear-cut. On one hand, if sophisticated publishers only slightly inflate the Value CPM of the winning header bid, then the above conclusions continue to hold for exactly the same reasons. On the other hand, if sophisticated publishers significantly inflate the Value

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546) Professor Gans asserts that Google's conduct with respect to DA harmed competition in the market for ad exchanges.<sup>997</sup> Professor Gans provides no direct evidence that Google's conduct forced an existing competitor to exit, nor that it prevented a potential entrant to enter. Instead, the analysis on this issue is contradicted by basic market facts.<sup>998</sup> The growth of header bidding transactions and ad exchanges shows that there is competition in the market for ad exchanges, and that multiple ad exchanges has been able to compete with AdX in this market.

547) Professor Gans asserts that Google's revenue increased as a result of AdX's "Last Look" at publishers' impressions through DA and EDA.<sup>999</sup> While he insinuates that these increases were accomplished by way of "access[ing] competitor bids,"<sup>1000</sup> he does not demonstrate that these effects resulted from such access nor does he refute the hypothesis that any increases in AdX revenue from DA and EDA arise from these innovations improving efficient matches. For example, Professor Gans characterizes a Google document that describes an "[REDACTED] decrease in AdX revenue and [REDACTED] decrease in impressions due to giving up 'Last Look'" as "underscor[ing] the critical role played by the 'Last Look'

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CPM of the winning header bid due to Dynamic Allocation and would not have set such an inflated reserve on AdX in absence of Dynamic Allocation, then the cost of this inflated reserve might outweigh the benefits highlighted above.")).

Professor Weinberg also concludes that Dynamic Allocation reduces quality (Weinberg Report, at ¶130 ("Dynamic Allocation, no matter how publishers set Value CPMs, would result in lower quality ads displayed on high-value impressions when exchanges participate primarily through the waterfall. Similarly, Dynamic Allocation with default options would result in lower quality ads displayed on all impressions when exchanges participate primarily through header bidding. This follows because Dynamic Allocation results in AdX winning additional impressions, and displaying ads of whatever quality it tends to display.")). However, he does not demonstrate that AdX serves ads that are lower quality than those of rival ad exchanges.

<sup>997</sup> Gans Report, at ¶ 551 ("The following discussion will present evidence relevant to Google's conduct with respect to DA, the choices it faced, its intent when making those choices, and evidence that this resulted in the predicted harm to competition in the exchange market.").

<sup>998</sup> See Section IX.C.1.

<sup>999</sup> Professor Gans defines "Last Look" as "where AdX 'gets to bid with knowledge of the clearing price.'" (Gans Report, at ¶594). Professor Gans also notes that Last Look was a "Pre-acquisition feature of dynamic allocation." (Gans Report, at fn. 755).

<sup>1000</sup> Gans Report, at ¶609.

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advantage, which allowed AdX to access competitor bids until the adoption of first-price auctions in 2019.”<sup>1001</sup> However, the loss of [REDACTED] of revenue from AdX does not suggest that alleged “access to competitor bids” was “critical” to the success of AdX. In the absence of DA and EDA, publishers’ ad space is less likely to be filled by the advertiser willing to pay the most for the impression. Because of the increases to matching efficiency, DA and EDA can result in AdX winning more impressions because it offers higher prices (benefiting publishers) and because advertisers can more efficiently target the users they seek. These outcomes do not depend upon access to competitor bids.

548) Contrary to Professor Gans’ allegations that DA and EDA decreased revenues to publishers, monthly revenue increased steadily from roughly [REDACTED] in June 2013 to approximately [REDACTED] in March 2023 for the group of publishers who used DA and EDA.<sup>1002</sup> Exhibit 29 shows that the annual publisher revenue for this group increased from less than [REDACTED] dollars in 2014 to over [REDACTED] dollars by 2022.

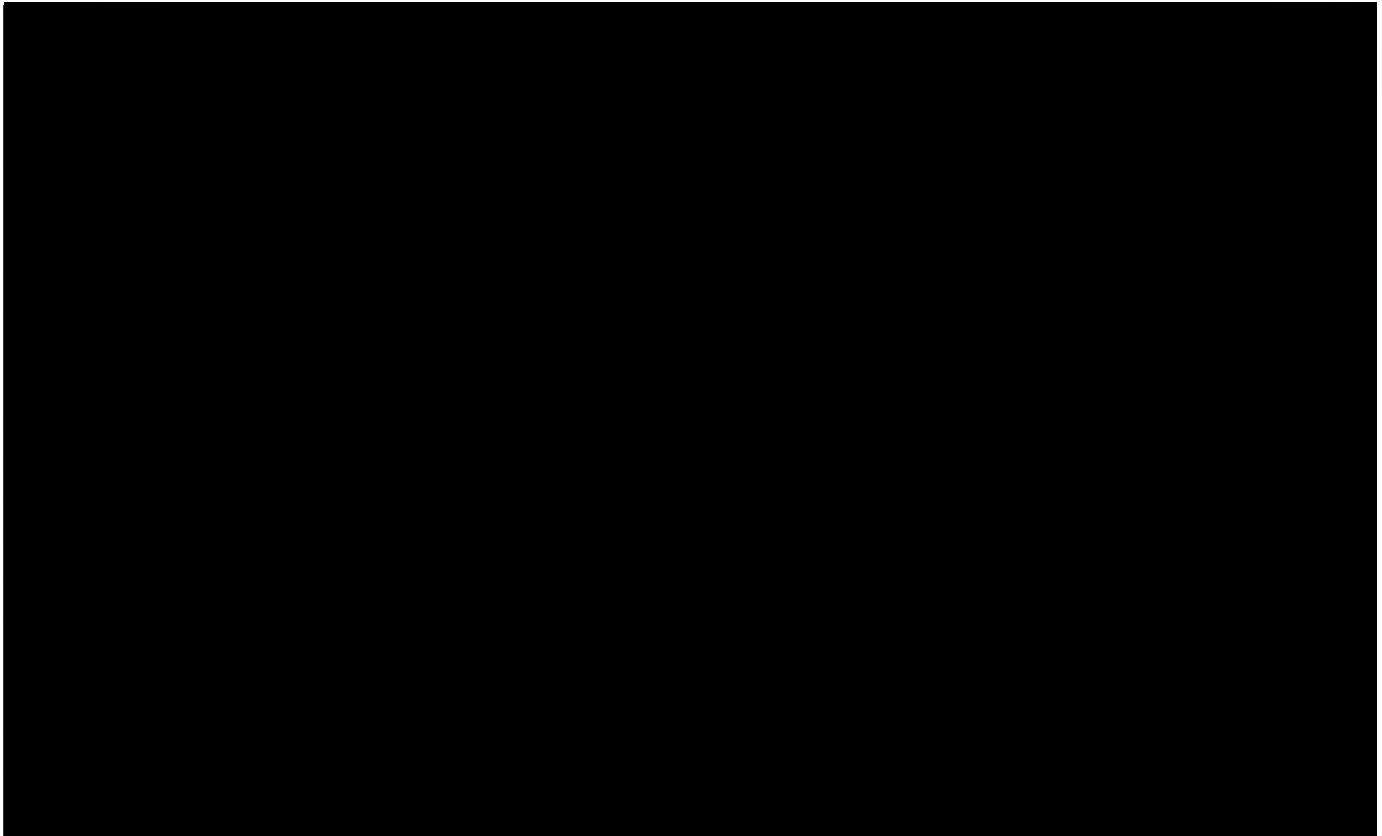
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<sup>1001</sup> Gans Report, at ¶609.

<sup>1002</sup> See Figure 162.

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**Exhibit 29**



Notes: Publishers are considered affected by DA and EDA if they transact across a combination of Direct Deals and any other transaction venue in the given month. AdX and AdSense impressions not identifiable as belonging to GAM publishers are excluded. Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

549) Even more, EDA did not, as Professor Gans suggests,<sup>1003</sup> make guaranteed reservation ad inventory exclusively available to AdX. EDA also made guaranteed reservation ad inventory available to other (non-AdX) demand sources directly via its decision rules.<sup>1004</sup> EDA allocated impressions to

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<sup>1003</sup> Gans Report, at ¶630 (“EDA enables AdX (and only AdX) to transact impressions that would have been allocated to direct deals if it results in a higher clearing price. More specifically, AdX was given the ability to use the highest valued line item price as its reserve price, and transact the impression if it can beat this reserve price. No other exchange has this ability.”).

<sup>1004</sup> GOOG-TEX-00158694, at -694-695 (“Enhanced Dynamic Allocation introduces competition between guaranteed reservations and other demand including AdX and DFP remnant reservations, by allowing AdX or DFP remnant to win over high priority DFP guaranteed reservations if it has a higher price than the opportunity cost (also called EDA price) set by us. The EDA price is calculated in such a way that the DFP guaranteed reservation’s delivery goal would not be compromised.”).



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AdX only if the AdX high bid exceeded the expected vCPM of all other demand sources and the EDA price; otherwise it sent the impression to the publisher's demand partners according to the publisher's specified waterfall ordering. In particular:

- a. Publishers could also make guaranteed reservation impressions available to third-party exchanges through header bidding. Publishers could obtain header bids for guaranteed reservation impressions and pass these bids to DFP as remnant line items. The header bid would then factor into the price floor—and ultimately win the impression if higher than the AdX bid, the EDA price, and the vCPM's of the other remnant line items.<sup>1005</sup>
- b. Data from Google indicate that third-party exchanges bidding through header bidding likely benefited from EDA in the same way that Plaintiffs allege AdX benefited from it. For example, data show that there were over 1,600 publishers in nearly every month that both used header bidding and displayed ads that AdX won through EDA—that is, AdX winning impressions where the competing transaction type was a guaranteed deal.<sup>1006</sup> It is reasonable to infer that for these 1,600 publishers, header bidding line items competed against guaranteed line items and AdX bids in auctions in which EDA applied. Data show that these 1,600 publishers for which EDA applied accounted for significantly more

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<sup>1005</sup> GOOG-AT-MDL-008842393, at ¶¶11-14 (In his Declaration from August 2023, Nitish Korula, an engineer at Google, explained that “[u]p until at least December 2021, the winning bid from the Header Bidding auction was typically used to trigger a specific line item that the publisher had booked within Google’s ad server (most commonly a remnant line item), and ... the Value CPM of that line item could represent the winning Header Bidding bid as a floor in the AdX auction (prior to September 2019) or as a competing bid in the Unified First Price Auction (from September 2019 onwards).”).

<sup>1006</sup> See Figure 163.

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header bidding impressions, in aggregate, than header bidding publishers for which EDA likely did not apply.<sup>1007</sup>

- c. In addition, once Open Bidding launched in April 2018, third-party exchanges were able to bid in real-time against AdX for “impressions.”<sup>1008</sup> All guaranteed reservation impressions from publishers who chose to use Open Bidding were made available to third-party exchanges at the same time as AdX, and to the extent that such impressions were not sent to Open Bidding, it was due to the publisher’s choice.

**C. Line Item Capping Had a Legitimate Business Rationale and Did Not Harm Competition**

550) The data show that line item capping had procompetitive justifications and did not harm competition.<sup>1009</sup>

***1. Background on Line Item Capping***

551) In Google’s ad server, publishers create line items to identify the types of ad inventory that they will offer to various sources of demand (ad exchanges, ad networks, directly sold campaigns). “Line items contain information about how specific ad creatives are intended to serve to your website or app

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<sup>1007</sup> See Figure 164.

<sup>1008</sup> Declaration of Nitish Korula on August 4, 2023 (GOOG-AT-MDL-008842393, at ¶23); Google Ad Manager Help, “Ad competition with dynamic allocation,” available at: <https://support.google.com/admanager/answer/3721872?hl=en>. Accessed April 1, 2024.

<sup>1009</sup> Professor Gans alleges that: “[t]he third way in which Google impaired the use of its ad server products was by imposing restrictions on “line items” to limit the use of Header Bidding by publishers.” Professor Gans claims that “[w]hile Google offered various technical explanations for the caps, these were pretextual.” Professor Gans further alleges that “[b]y capping the number of line items publishers can set, Google’s ad server then artificially limits the competitiveness of Header Bidding exchanges compared to its own ad exchange, impairing price competition in the ad exchange market.” Gans Report, at ¶¶634, 646, 661.

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along with pricing and other delivery details.”<sup>1010</sup> Line items also contain the requirements that publishers set for the ad to be selected.<sup>1011</sup> For example, the publisher may implement a direct deal negotiated for sports pages targeted at males between the ages of 18 and 32 by setting up tags such that, when such an impression arrives, the direct deal will serve specifically to that group.<sup>1012</sup>

552) Header bidding takes advantage of the targeting feature associated with line items. Implementing header bidding with DFP involves creating line items where every price would be associated with a line item and each line item would be targeted at a key value that specified the price. For example, if a publisher would accept anywhere from \$0.50 to \$1.00 (what the publisher believes to be reasonable lower and upper bounds) for an impression, they may implement header bidding by setting up separate line items for every \$0.01 increment within that range of prices—in this example, 51 separate line items.<sup>1013</sup> Because implementing header bidding “could mean having to create thousands of line items, most companies will automate these steps.”<sup>1014</sup>

553) In December 2013, Google imposed limits on the number of line items, capping publishers at 61,000 active line items per publisher network “to protect the health of the product [and] the

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<sup>1010</sup> Google Ad Manager, “About line items,” available at: <https://support.google.com/admanager/answer/9405477>. Accessed April 1, 2024.

<sup>1011</sup> Google Ad Manager, “About line items,” available at: <https://support.google.com/admanager/answer/9405477>. Accessed April 1, 2024.

<sup>1012</sup> I based this example on a similar scenario from Google’s support pages. See Google Ad Manager Help, “Get started with key-values,” available at: <https://support.google.com/admanager/answer/188092>. Accessed April 1, 2024.

<sup>1013</sup> Oko Ad Management, “The Header Bidding Process,” available at: <https://oko.uk/blog/the-header-bidding-process>. Accessed April 1, 2024.

<sup>1014</sup> Prebid, “Google Ad Manager with Prebid Step by Step,” available at: <https://docs.prebid.org/adops/step-by-step.html>. Accessed April 1, 2024; Prebid, “How to simplify line item setup,” available at: <https://docs.prebid.org/overview/how-to-simplify-line-item-setup.html>. Accessed April 1, 2024.

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performance of [Google's] system.”<sup>1015</sup> The limit was imposed after a publisher had 8,000,000 active line items, causing “a huge strain on the system.”<sup>1016</sup>

554) Although internal communications from as early as 2014 reflect the importance of line item limits for the stability of Google's ad server,<sup>1017</sup> the line item cap was not enforced until the end of 2018.<sup>1018</sup> After enforcement of the line item cap, publishers who tried to create more than 61,000 active line items without obtaining an exception from Google would receive an error message.<sup>1019</sup> Google engaged in proactive outreach to notify those publishers close to exceeding the limit (or that had already exceeded the limit) that the limits would be enforced and created a flexible approach to allowing exceptions for those publishers through January 31, 2019.<sup>1020</sup>

**2. *Professor Gans' Analysis of Line Item Capping Does Not Support a Conclusion that it Anticompetitively Steered Customers to AdX***

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<sup>1015</sup> GOOG-DOJ-09494195, at -195 (“Limits are necessary in order to protect the health of the product, the performance of our system, and are ultimately for the benefit of all publishers and the performance of their UI.”); GOOG-DOJ-09494195, at -198 (“This [active line item] limit is not enforceable but is the max number of [line items] that can be supported by the ad server without additional eng[ineering] changes.”); GOOG-AT-MDL-004345238, at -245; GOOG-DOJ-13340828, at -828.

<sup>1016</sup> GOOG-DOJ-09494195, at -202; GOOG-DOJ-13340828, at -828.

<sup>1017</sup> GOOG-DOJ-13340828, at -828 (“We always knew that we needed limits because they are a core component of a sound stability strategy for any world-class system. If we could have waved a magic wand and had limits in place years ago, we would [have].”).

<sup>1018</sup> There were two types of active line item enforcement: Small Business and Premium (GAM360). Premium is the paid premium version of GAM360, which caters to publishers with larger volumes of traffic, more complex advertising setups, or more advanced needs. *See generally* Bea Jankowska, “Google Ad Manager vs Google Ad Manager 360 – Everything You Need to Know,” Yieldbird, <https://yieldbird.com/research-hub/google-ad-manager-vs-google-ad-manager-360-everything-you-need-to-know/>. Accessed July 18, 2024. Small Business enforcement officially started by December 2018 and Premium was slated to start on January 2, 2019. *See* GOOG-DOJ-06883919, at -919; GOOG-DOJ-15127379, at -380; GOOG-DOJ-AT-01816818, at -821.

<sup>1019</sup> GOOG-DOJ-AT-01816818, at -818, -822 (“Q: How will a Publisher know if they’ve exceeded either the ALI or Active Ad Unit limit? A: They will be unable to create new entities and will receive an error message letting them know they have exceeded the limit if they try to do so.”); Google Ad Manager Help, “System maximums and limits,” available at: <https://support.google.com/admanager/answer/1628457>. Accessed April 1, 2024. (“Google Ad Manager enforces the following limits [including active line item limit] to ensure system stability”).

<sup>1020</sup> GOOG-DOJ-AT-01816818, at -821. Google made clear that “the objective is not to disrupt any of those pubs operations, so the plan is to [sic] flexible on allowing exceptions.” (GOOG-DOJ-15127379, at -380).

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555) Professor Gans concludes that “Google’s line item caps harmed competition in the ad exchange market” because they “restricted competition from Header Bidding exchanges.”<sup>1021</sup> However, Professor Gans’ conclusions are not based on any data analysis showing that line item caps impacted competition from header bidding. Nor does Professor Gans point to any documents that demonstrate actual reductions in market outcomes stemming from line item caps.

556) Professor Gans asserts that line item caps “impair[ed] price competition in the ad exchange market,”<sup>1022</sup> but provides no economic analysis to demonstrate any impact on prices or competition. As I have already shown, the evolution of prices in the candidate market for ad exchanges is inconsistent with Professor Gans’ narrative. Further, header bidding continues to be popular among publishers.<sup>1023</sup>

557) Professor Gans also asserts that “Google’s restrictions on line items decreased publishers’ yield,”<sup>1024</sup> but provides no evidence that the average or median publisher in his candidate market earned less revenue.<sup>1025</sup> His conclusion of market impact appears to be based solely on the isolated experiences of four publishers: CBS, Walmart, Daily Mail, and The Washington Post. Even for these four publishers, and despite the large volumes of data available in this case, he does not provide any data or documents that actually describe the yields of these publishers or how their yields were impacted by line item caps.

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<sup>1021</sup> Gans Report, at ¶¶660-661.

<sup>1022</sup> Gans Report, at ¶661.

<sup>1023</sup> Figure 134 shows impressions won by header bidding.

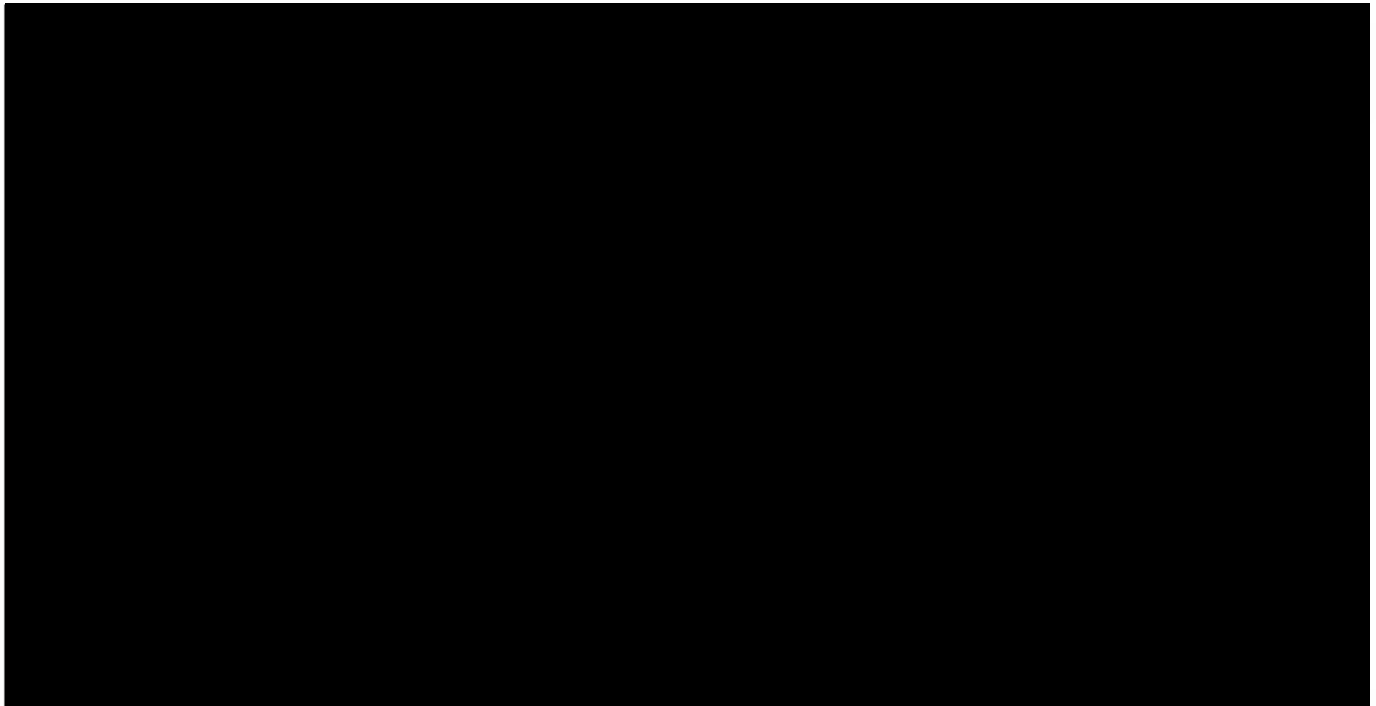
<sup>1024</sup> Gans Report, at ¶663.

<sup>1025</sup> Yield is defined as “[t]he amount of revenue a Publisher is able to make from its inventory.” Additionally, “yield management” “generally refers to maximizing the revenue of publishers.” (Clearcode, “Yield,” available at: <https://clearcode.cc/glossary/yield/>. Accessed June 20, 2024; Microsoft Platform, “Online advertising and Ad tech glossary,” February 13, 2024, available at: <https://learn.microsoft.com/en-us/xandr/industry-reference/online-advertising-and-ad-tech-glossary#s-z>. Accessed June 20, 2024).

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558) Contrary to Professor Gans’ assertions, and as shown in Exhibit 30, data available in this case show that header bidding has continued to grow.<sup>1026</sup> Indeed, Professor Gans acknowledges that: “[i]n a 2018 document, Google explained that there is little they can do to stop Header Bidding adoption.”<sup>1027</sup>

**Exhibit 30**



Notes: Header bidding impressions are those in DFP Reservations data where HB\_Exchange is any value other than “No HB” or blank.  
Source: MDL RFP 243 DFP Reservations Data.

559) As I have emphasized, harm to competition requires demonstration of market impact. Professor Gans does not conduct any empirical analysis showing that market-wide output decreased, that prices in his narrowly defined ad exchange market increased, that ad tech quality decreased, or that

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<sup>1026</sup> For a monthly view of header bidding impressions, *see* Figure 165.

<sup>1027</sup> Gans Report, at ¶485.

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publishers as a whole were harmed. Nor does he demonstrate that, in a but-for world with unlimited line items, customers would have been better off. As discussed in more detail below, he also ignores a number of reasons customers might have benefited from line item caps.

**3. *Professor Gans Ignores the Legitimate, Procompetitive Business Rationale for Line Item Caps***

560) Professor Gans assumes that line item caps only harm publishers and that Google's only motivation to implement them was to inflict harm to ad exchange rivals. He ignores evidence in the record indicating that firms that abuse the number of line items can inflict negative externalities on other publishers and that Google has a legitimate, procompetitive business interest in preventing those negative externalities.

561) Economics teaches us that it is common for firms to establish and enforce rules of behavior to promote efficient use of the company's assets, preventing abuse and degradation of the service offered. For example, some car rentals may be accompanied by mileage limits to prevent drivers from incurring excess wear and tear on the vehicle during their rental. Likewise, the computational resources of a firm may be subject to inefficient usage if some customers ignore the potential for their actions to cause delayed computing times, server outages, and/or software running out of resources. Web hosting services like GoDaddy or Bluehost provide various hosting plans with limits on website bandwidth, storage space, and the number of websites users can host.<sup>1028</sup>

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<sup>1028</sup> GoDaddy, "GoDaddy - Hosting Agreement," available at: <https://www.godaddy.com/legal/agreements/hosting-agreement>. Accessed April 29, 2024; Html.Com, "BlueHost Boast 'Best Web Hosting' Around. We Decide If They Live Up To The Claim," available at: <https://html.com/web-hosting/bluehost/>. Accessed April 29, 2024.

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562) Similarly, Google’s “System maximum and limits” guidelines, including those regarding the use of active line items, define a set of rules for transacting ad inventory through GAM that help protect the system overall.<sup>1029</sup> There are legitimate business and procompetitive reasons for Google to enforce its guidelines, including those regarding the use of active line items. Actions that protect DFP’s reliability and performance are procompetitive, benefiting customers through a higher quality product, leading to an increase in publisher demand for Google’s ad server, and ultimately benefiting advertisers as they are offered a larger number of ad impressions.

563) Google’s enforcement of the line item cap on publishers prevents adverse publisher experience with Google’s DFP ad server that could impede their ability to sell ad inventory. Google observed that “[p]ublishers can slow or crash infrastructure and create fire-drills” by using large numbers of line items.<sup>1030</sup> In 2016 and 2017, Google began to see an increase in the number of publishers exceeding the active line item limit.<sup>1031</sup> Sometimes, there were 1,000 times more line items than the system was designed to support.<sup>1032</sup> One publisher “almost crashed” Google’s ad serving stack by implementing one million active line items.<sup>1033</sup> Documents also describe, through 2017, a high volume

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<sup>1029</sup> Google Ad Manager Help, “System maximums and limits,” available at: <https://support.google.com/admanager/answer/1628457>. Accessed April 1, 2024.

<sup>1030</sup> GOOG-DOJ-07955876, at -890.

<sup>1031</sup> GOOG-DOJ-07955876, at -882.

<sup>1032</sup> Deposition of [REDACTED] (Google) on November 6, 2020, GOOG-AT-MDL-007172126 (hereafter “[REDACTED] (Google) Deposition”), at 50:5-20 (“Q: And why was using line items for realtime pricing a risk to Google’s AdServer? A: The way the system was built is that line items were always intended to be reservations. There wasn’t a concept of using them for realtime pricing. And so we had in mind that publishers would have, you know, possibly thousands of line items and the system was built to scale to that, but with using line items for realtime pricing, which is not what they were designed to be used for, there were ten, sometimes ten times, sometimes 100 times, sometimes 1,000 times more line items than the system was designed to support.”).

<sup>1033</sup> The Network Health Team at Google clearly identified these infrastructure-related issues (among others) and categorized them as “Systemic Risk” and “Expense” problems. (GOOG-DOJ-06875572, at -592, -574). The same Google strategy document demonstrates quite clearly that Google used line item caps as a method to protect against these issues. In other words, Google reactively enforced line item caps to protect the quality of their product and manage costs. (GOOG-DOJ-06875572, at -598).



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of line items posed a risk of system overload for DFP,<sup>1034</sup> leading to infrastructure outages that required Google to incur additional engineering expenses to remediate.<sup>1035</sup> In 2018, Freestar exceeded the line item cap which resulted in 578.5 million ad queries in DFP dropped (1.5 million dropped for Freestar, 577 million dropped for other publishers).<sup>1036</sup> Because excessive line items posed a threat to the ad server, there was an internal push within Google for more adherence to the limit.<sup>1037</sup>

564) Google's enforcement of the line item cap is also consistent with the legitimate business justification of limiting costs.<sup>1038</sup> Specifically, Google noted that every incremental 60,000 line items is associated with a 1- to 2-percent increase infrastructure costs.<sup>1039</sup>

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<sup>1034</sup> For example, in a report from December 2017 Google notes that "a 'publisher used a third party script to automatically change their setup via the DFP FE. Their reconfiguration resulted in their queries returning 1700 ads for many of their queries, increasing the memory required for processing those queries, and likely also slowing down the processing of those queries.'" (GOOG-AT-MDL-C-000017978, at -979). "[Google] disabled the publisher ... since they were hurting system health and abusing [Google's] system." Additionally, Google notes a list of "[t]hings that went poorly" which included the following point: "A publisher was able to make a change that caused serious system instability." (GOOG-AT-MDL-C-000017978, at -980). Similarly, in a report from May 2018, Google notes another issue caused by "an increase in GFP PSI lookups for a specific publisher that returned ~100-500 ads per request." (GOOG-AT-MDL-C-000018330, at -331-332). Further, in a report from June 2018, Google notes that a "publisher UOL created a large n[umber] of native styles (~2000) with a large n[umber] of key-value targeting terms (~220) associated with each style, the cost/time of processing the request in the PSI matchlet increased geometrically," which caused a problem that lasted "20 hours+." (GOOG-AT-MDL-C-000018393, at -394-395).

<sup>1035</sup> [REDACTED] (Google) Deposition, at 54:6-11. ("We had to have more computer resources to be able to manage all the line items and we had more engineering costs related to emergencies whenever somebody would create a lot of line items and then it put our system at risk."); [REDACTED] (Google) Deposition, at 204:15-19. ("[M]anaging the extra line items, frequently caused emergency outages that required engineers to be up through the night, on weekends to address it and impacted other publishers.").

<sup>1036</sup> GOOG-AT-MDL-C-000018303, at -304.

<sup>1037</sup> See, e.g., GOOG-DOJ-13376687, at -689 ("Starting an engineering e-mail thread 'for discussing the long term solution on active line item limits' and considering the role of header bidding.").

<sup>1038</sup> An internal Google presentation titled "PRD/Strat[egy] review: Network health" notes that "[t]he health team works from the shadows to protect our systems and our margins" with some of the risks noted being to "prevent systemic risk" and "manage infra[structure] expense." (GOOG-DOJ-06875572, at -574).

<sup>1039</sup> GOOG-DOJ-06875572, at -586.

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565) A Google strategy document confirms that Google used line item caps as a method to protect against these issues.<sup>1040</sup> As a communications document designed for Google's account managers explained:

“Allowing publishers to operate their account without any limits can adversely affect the UI in terms of load time and serving in some cases. We are adding limits to protect the health of the product. A publisher maintaining extreme object branching not only impacts the performance of DFP for themselves, but can also adversely affect other publishers. Limits protect the reliability of the performance of the system for the ultimate benefit of all publishers.”<sup>1041</sup>

**4. Data and Documents are Inconsistent with Anticompetitive Harm due to the Line Item Cap**

566) Moreover, documents and data are inconsistent with Professor Gans' conclusion that this practice restricted competition with rival ad exchanges.<sup>1042</sup>

567) As an initial matter, my economic analysis demonstrates that only 0.02 percent of publishers were above to the line item cap, which is consistent with the conduct being procompetitive rather than anticompetitive. Exhibit 31 shows the distribution of line items used by publishers (via Google's DFP server) sampled from one day of activity, April 25, 2024. I observe that: (i) 90 percent of publishers' daily number of line items is no more than 158, (ii) 99 percent of publishers' daily number of line items is no more than 15,317, (iii) 99.9 percent of publishers' daily number of line items is no more than 54,291. It is worth emphasizing that the 99.9th percentile of publishers (where publishers are ranked

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<sup>1040</sup> A Google presentation lists “hard limits” and “soft limits (exception possible)” as “tools...to protect [Google's] systems and margins.” (GOOG-DOJ-06875572, at -574).

<sup>1041</sup> GOOG-DOJ-09494195, at -197.

<sup>1042</sup> Professor Gans asserts that “[p]ublishers’ benefit from a high granularity when setting up line items[,]” but provides no analysis of whether the conditions that produce such benefits are binding for a significant number of publishers, nor does he establish that any such benefits are material to publishers as a whole. (Gans Report, at ¶640).

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based on the number of line items they use) are bounded away from the 61,000 limit by at least 6,709 line items that were not used. This shows that the cap on line items did not have a material impact on the proportion of publishers on DFP using more than 50,000 active line items.

**Exhibit 31**  
**Publishers' Distribution of Active Line Items on April 25, 2024**

<u>Statistics</u>	<u>Active Line Items</u>
(a)	(b)
Mean	607.73
Standard Deviation	3,785.03
Minimum	1
Median	2
75th Percentile	9
90th Percentile	158
99th Percentile	15,317
99.9th Percentile	54,291
Maximum	150,525

Source: GAM Publisher Active Line Item Data.

568) Further, in very few instances (no more than 0.02 percent percent of publishers during the one-day sample), the daily number of line items greatly exceeds the line item cap of 61,000, which is consistent with documents that at least some publishers received exceptions.<sup>1043</sup> Thus, as a matter of economics, it is not obvious that any publisher was constrained from serving the full range of header bidding outcomes that it needed. Despite marketing messages about exceptions being rare,<sup>1044</sup> Google

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<sup>1043</sup> Google has an economic incentive to grant a temporary exception to publishers who use more than 61,000 line items (i.e., the line item cap) so that they continue to offer their ad inventory to advertisers without interruption. For example, one document in the record indicates that, when publishers requested exceptions to the limits, Google addressed and responded to the requests, granting exceptions in scenarios where the publisher was “strategic,” it made “economic sense,” and the publisher’s implementation was “optimal and supported.” (GOOG-DOJ-06875572, at -577).

<sup>1044</sup> GOOG-DOJ-09494195, at -201-202 (“In very rare cases, we can support a higher number of active line items; however, there are several eng changes that need to take place in order to support this. This means that we need several weeks [sic] lead time to support any changes to this limit if the increase is approved.”).

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appears to have granted the vast majority of exception requests from large publishers:<sup>1045</sup> Google approved eleven out of the fourteen requests for exceptions that were requested between 2018 and 2020 (of the eleven approved requests, at least eight approvals were for temporary exceptions).<sup>1046</sup>

569) Even the small number of publishers which were constrained by the line item caps were not necessarily harmed, and rival exchanges bidding for their header bidding impressions were not necessarily disadvantaged.<sup>1047</sup> For example, the cap on line items might only be a mild inconvenience for some affected publishers, who employ far more line items to address their heading bidding inventory than would be required in practice.<sup>1048</sup> In assessing the impact of the line item cap, I analyze whether publishers who are close to the line item cap have reduced their reliance on header bidding.

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<sup>1045</sup> For instance, in December 2018, Hearst, after acquiring Jumpstart Auto, requested a temporary increase in the active line item limit. Google employees acknowledged that Jumpstart Auto was in the car sales vertical—a vertical known for a “high volume of very granular direct line items”—and thus they decided to increase the line item limit to 75,000 for six months. (GOOG-AT-MDL-C-000018732, at -732). Similarly, in 2022, Google approved an increase to the active line items of Nextdoor because “Nextdoor’s ads business is hyper local targeting. Their team is nearing their limit, and will be unable to run build audiences, target, run reporting, etc.” The limit was extended to 150,000. (GOOG-AT-MDL-C-000018727, at -727-728).

<sup>1046</sup> GOOG-DOJ-AT-01980370.

<sup>1047</sup> If a publisher would have benefited from implementing more than 61,000 line items, it could respond to the cap in a variety of ways that minimize its potential to interfere with header bidding. For example, publishers need not implement a fixed one-cent interval between each price level associated with header bidding outcomes in DFP. The header bidding solution used by the publisher translates the results into any price that the publisher wishes AdX to compete against. If header bidding responds with a CPM price of \$1.23, the header bidding solution can communicate a targeting key value of \$1.25, \$1.20, or other price increments to GAM in the targeting key value. Nor do these increments need be implemented uniformly across values—near the expected response the publisher could use one-cent increments and use larger increments as the value grows, reflecting both the lower probability of those responses and a wider tolerance for difference between the AdX outcomes and those of header bidding on these relatively infrequent impressions. Similarly, if the publisher shifts the pricing buckets for header bidding, it does not necessarily mean that header bidding loses. It merely means that header bidding might win some impressions that it would have lost to AdX under more granular price buckets as well as AdX might win some impressions that it would have lost under more granular price buckets. Therefore, the mechanism by which header bidding operates provides publishers with flexibility to adapt to line item caps in ways that allow publishers to avoid potentially negative impacts of the caps.

In fact, in the early stages of header bidding being used, in 2016 and 2017, Google noted that “AdX has actually benefited in most cases from [header bidding].” See GOOG-DOJ-09475820, at -839. Additionally, in 2016, AdX’s Y-o-Y growth was [REDACTED] without header bidding compared to [REDACTED] with header bidding. (GOOG-TEX-00348289, at -319).

<sup>1048</sup> Economists refer to moral hazard in situations similar to this where an economic actor engages in sub-optimal care because they are not subject to the full consequences of their actions. See Cassandra Jones Havard, “What does ‘moral hazard’ mean?” University of

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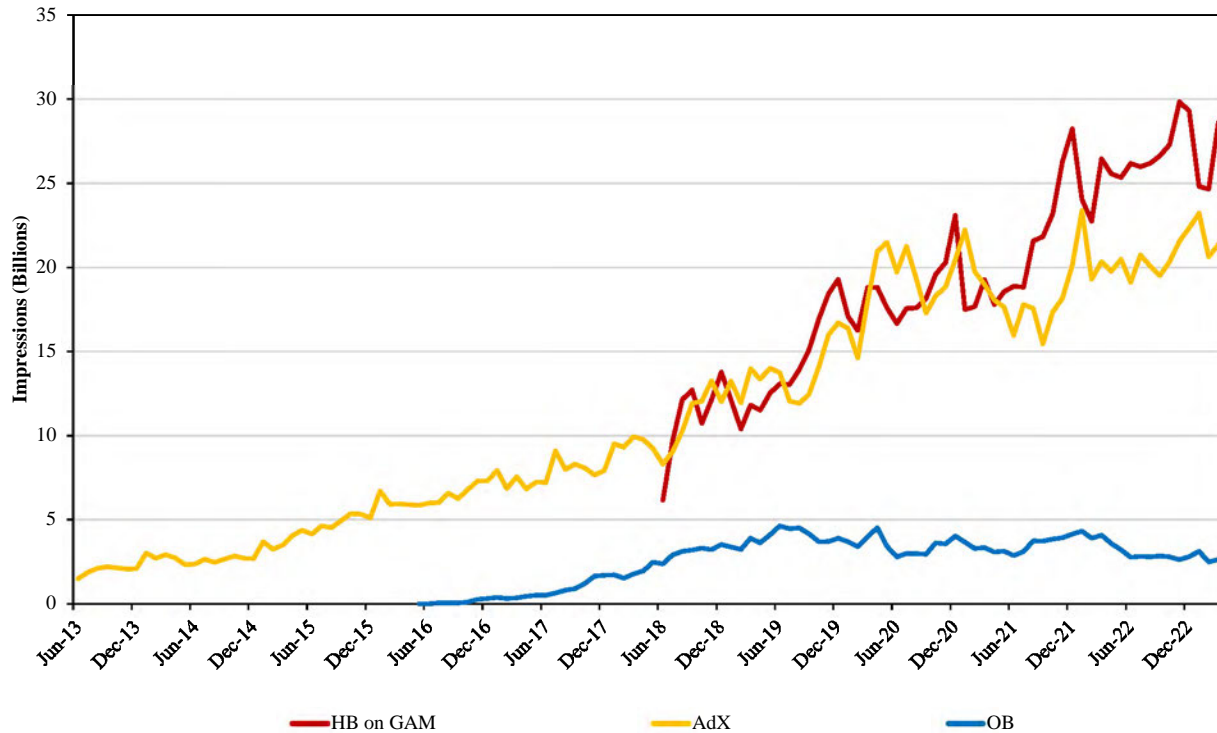
570) Google data indicate that the number of display ads (narrow) impressions transacted through header bidding by publishers in the top 0.1 percentile of the line item usage distribution (i.e., publishers who use a number of line items higher than the 99.9th percentile of line items) has doubled: it has *increased* from 12 billion in January 2019 to 24 billion in January 2022. This increase in header bidding transactions for these publishers does not appear to have been slowed by an increased reliance on Open Bidding: the number of display ad (narrow) impressions transacted through Open Bidding by the top 0.1 percent of publishers has decreased since reaching a peak of 5 billion in June 2019 to around 3 billion in March 2023 (see Exhibit 32).

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South Carolina, March 21, 2023, available at: [https://sc.edu/uofsc/posts/2023/03/conversation\\_moral\\_hazard.php](https://sc.edu/uofsc/posts/2023/03/conversation_moral_hazard.php). For example, given the automated nature of deploying line items, a publisher may deploy a larger-than-necessary number of line items to avoid their own internal cost of reviewing data to identify the reasonable range of header bidding outcomes.

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**Exhibit 32**  
**Volume of Impressions for Display Ads (Narrow) Sold by Publishers in the Top 0.1% of Active Line Item Distribution**  
**June 2013 - March 2023**



Notes: Limited to publishers recorded in the Active Line Item Data from April 25, 2024. Limited to impressions viewed by U.S. users.  
 Source: GAM Publisher Active Line Item Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

571) Moreover, the average number of distinct exchanges in header bidding utilized by the top 0.1 percent of publishers in terms of active line items has remained relatively constant at around 8, indicating a non-decreasing reliance on header bidding, rather than the decline that Plaintiffs have alleged.<sup>1049</sup> These patterns reflect greater engagement in header bidding auctions over time as well as more options for advertisers to buy ads through header bidding.

<sup>1049</sup> See Figure 166. In Figure 167 one can observe that the average number of distinct header bidding exchanges utilized by all Google publishers (i.e., publishers who use AdX or DFP) has increased from 2.4 in January 2019 to 2.9 in February 2023.

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572) Professor Gans asserts that Google's Header Bidding Manager (HBM) tool only partially addressed publishers' needs for additional line items, and was a confidential offering.<sup>1050</sup> Professor Gans notes that HBM "did not fully solve the issue of publishers requesting line item limit exceptions as it had limited functionality."<sup>1051</sup> However, as discussed above, since Google started to actively enforce the line item cap, there have been a number of publishers who have been granted an exception from the policy. The fact that exceptions were granted is consistent with Google helping publishers who needed a large number of line items to offer their ad inventory for sale. Professor Gans' claim that "HBM only partly satisfied publishers' needs and ability to expand their Header Bidding strategies" does not accord with industry facts.<sup>1052</sup> As I showed in this section, Google's challenged conduct did not restrict publishers' use of header bidding.

573) In sum, publishers who were using a number of line items close to the cap enforced by Google neither decreased their reliance on header bidding nor increased their reliance on Open Bidding. These economic findings directly contradict Plaintiffs' claims that Google's conduct limited publishers' implementation of line items to foreclose competition from header bidding and forced them to switch to Open Bidding.<sup>1053</sup> Moreover, I have shown that there is no evidence of harm to publishers who use header bidding to sell (part of) their ad inventory. To the contrary, Google's enforcement of active line

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<sup>1050</sup> Gans Report, at ¶¶657-659.

<sup>1051</sup> Gans Report, at ¶658.

<sup>1052</sup> Gans Report, at ¶659.

<sup>1053</sup> Fourth Amended Complaint, at ¶¶391-392 ("Google purposefully limits publishers' implementation of line items to foreclose competition from header bidding." Google "also limited the number of line items publishers could use, even though DFP allows for a greater number to be implemented, to pressure publishers to switch to Exchange Bidding."). See Gans Report, at ¶¶634, 670, 648 ("Google imposed restrictions on the number of line items publishers could use ('line item caps'), in an effort to limit the adoption of Header Bidding." Gans further claims that "Google's refusal to increase line item limits harms publishers' abilities to implement their Header Bidding strategies." Gans claims that "Google used line item limitations as a way to make Exchange Bidding more attractive.").

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items was followed by an increase in the number of publishers selling ad inventory through third-party exchanges via header bidding.

**D. Redaction of Auction Reports Had a Legitimate Business Rationale and Did Not Harm Competition**

574) Google provides publishers with access to highly detailed data on the auctions run through Google's publisher ad server and has expanded these data over time. Where Google does limit the ability of publishers to join certain fields in the data it provides, documents in the record are consistent with Google balancing across all sides of the multi-sided platform it operates. Professor Gans' conclusions that Google's concerns over advertisers' privacy preferences were pretextual, and that the way Google provided auction data harmed competition in his candidate ad exchange market, are speculative and not supported by an examination of the data in question.<sup>1054</sup> Professor Gans ignores evidence consistent with economic theory indicating that providing publishers with unfettered access to advertiser bidding choices likely would drive advertisers away from its platform.

***1. Background on Data Redaction in Auction Reports***

575) As part of GAM's services to its users, Google makes certain data available to them through Data Transfer (DT) files. These files, which are available only in GAM360, give publishers insights into the impressions that were actually served on their websites, including the bid price, when the impression

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<sup>1054</sup> Professor Gans claims that "[t]he fourth way in which Google restricted the operation of ad servers and ad server tools was in its choice to redact information." Professor Gans alleges that "Google's true motivation in redacting data for publishers was to remove the ability of publishers to gain insights about their business on competing exchanges through joining the DT files, and ultimately to preference its ad exchange by removing publishers' abilities to compare their performance across competing exchanges and Header Bidding." Professor Gans further alleges that "redactions harmed competition in the ad exchange market, and reduced publishers' ability to effectively manage their inventory." Professor Gans concludes that "competition in the exchange market was harmed because publishers' incentives to consider rival exchange offerings were reduced." (Gans Report, at ¶¶677, 688, 695, 701).



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was served and the identity of the buyer.<sup>1055</sup> As early as August 2017, Google launched Exchange Bidding Data Transfer (BDT) files for large publishers as an alpha feature.<sup>1056</sup> Publishers receiving this data could join data fields across other DT files provided by Google to identify the full context of auctions inventory and delivery attributes.<sup>1057</sup> This in turn allowed them to leverage bid data to have a better understanding of advertisers' bidding strategies.<sup>1058</sup>

576) However, Google recognized that the BDT files were of limited utility to publishers because buyers were able to opt out of sharing their win/loss bid data, resulting in gaps in the data available to publishers.<sup>1059</sup> Overall adoption was low, and only 30 publishers had subscribed to BDT as a paid feature by June 2019.<sup>1060</sup> In September 2019, with the transition to Unified First Price Auction (UFPA), Google decided to remove the opt out and require all Authorized Buyers and Open Bidding Buyers to share

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<sup>1055</sup> Google's Response to U.K. Competition and Markets Authority ("CMA") Digital Advertising Market Study (2019), GOOG-DOJ-AT-01916384, at -398 ("Data Transfer Files give publishers insights into the impressions that were actually served on their websites, including the bid price, when the impression was served and the identity of the buyer.").

<sup>1056</sup> Google's Response to CMA Digital Advertising Market Study, GOOG-DOJ-AT-01916384, at -398 ("Google launched Bid Data Transfer as an "alpha" feature in August 2017 to give publishers insights into all bids, not just winning bids."). By February 2018, the same product was launched as a paid beta feature. *See* GOOG-DOJ-14164734 (In internal Google messages from February 2018, a Google employee notes that "we are in Closed Beta for bid DT right now.").

<sup>1057</sup> GOOG-DOJ-06882294, at -295 ("To summarize the DT file structure: [Google] provide[d] 9 different files – related to requests, impressions, bids, clicks, etc. Currently, all can be joined with one another at the event level." This document provides an explanation of how joining Data Transfer files allows publishers to answer particularized auction questions, such as what was the bid distribution on the iPhone for a specific ad unit (using Device, Ad Unit, and other data fields) or what were the auction dynamics for mobile users during the election in Ukraine (using Country, device, and other data fields)). *See also* GOOG-DOJ-AT-02327039, at -041, -044, -047 (providing examples of DT use cases, such as "Advanced Historical Data Analysis" and "Forecasting").

<sup>1058</sup> GOOG-DOJ-06882294, at -294; *see also, e.g.*, Google's Response to CMA Digital Advertising Market Study, GOOG-DOJ-AT-01916384, at -399 ("If an advertiser advertising toddler products bids for ad space on a publisher's page and wins, publishers would be able to see that this user has been shown this ad once, which could be a coincidence. However, should the Bid Data Transfer file be joinable with user IDs, publishers would be able to identify each time the advertiser of toddler products bid to show an ad to this specific user, including lost bids. This would provide publishers with significantly more data on the ads targeted to this user, and allow them to form a much deeper picture of the user and his/her interests.").

<sup>1059</sup> GOOG-DOJ-06882294, at -294-295.

<sup>1060</sup> An internal Google document from June 2019 states that "30 publishers currently subscribe to Bid DT as a paid feature." (GOOG-DOJ-06882294, at -294). *See also* GOOG-DOJ-AT-02321125, at -127 (an internal Google document last updated in August 2020 stating that "[t]here are ~30 pubs who currently use the Bid DT file as part of the Bid DT beta").

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win/loss bid data.<sup>1061</sup> Google modified BDT files to capture “complete visibility into all individual winning/losing bids and bid distribution” from all Authorized Buyers and Open Bidding buyers, rather than only from those buyers who had opted to share bid data.<sup>1062</sup>

577) On September 29, 2019, with the complete transition to UFPA, Google migrated the publishers that had already subscribed to Exchange BDT files to the new BDT files in closed beta.<sup>1063</sup> For instance, The New York Times, Dotdash, NewstoSend, Telegraph, and Dictionary were among a “list of pubs for initial Bid DT outreach.”<sup>1064</sup> The publishers on GAM360 that had already subscribed to predecessor versions of BDT files eventually became the first participants in the closed beta.<sup>1065</sup> Google viewed the new form of BDT files as an advantage of its transition to UFPA and a key feature for increased auction transparency.<sup>1066</sup> Google publicly acknowledged that with the transition to UFPA, “Ad

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<sup>1061</sup> GOOG-DOJ-AT-01906684, at -684-685 (“Before the launch of the first price auction, Authorized Buyers had the option to not share their bid data with publishers, resulting in gaps in the data available to publishers.”).

<sup>1062</sup> GOOG-DOJ-AT-01906684, at -690. *See also* [REDACTED], “An update on first price auctions for Google Ad Manager,” Google Ad Manager, May 10, 2019, available at: <https://blog.google/products/admanager/update-first-price-auctions-google-ad-manager/> ([In 2019], “not all Authorized Buyers [chose] to share . . . bid data, resulting in gaps in historical auction data [Google could] share with publishers and Authorized Buyers.”); GOOG-DOJ-07292531, at -537 (“Publishers will have access to bids from every individual buyer, i.e., the DSP [Demand Side Platform], Ad Network or Exchange (for e.g. [sic] Trade Desk, Display & Video 360 [sic] or Google Ads) and advertiser (e.g. [sic] P&G) that submitted the bid into each Ad Manager auction through their [Bid Data Transfer] files.”).

<sup>1063</sup> GOOG-DOJ-AT-01906684, at -684-685 (an internal Google document noting that “[s]tarting in mid September... [p]ublishers already subscribed to the Exchange Bidding Data Transfer (Beta) will automatically start receiving first-price bids from all Authorized Buyers (Auction Type= 2) and Exchange Bidding buyers (Auction Type =1) in their *NetworkBackfillBids*. There is no action needed to start receiving the updated file, however publishers will need to adapt their ingestion pipelines to the Bid DT schema changes.”).

<sup>1064</sup> GOOG-DOJ-AT-02041559 at -583.

<sup>1065</sup> GOOG-DOJ-AT-01906684, at -685 (“With the transition to unified 1st price auction now complete, Ad Manager 360 publishers will be able to get full visibility on all bids from all programmatic buyers ... “[p]ublishers already subscribed to the Exchange Bidding Data Transfer (Beta) will automatically start receiving first-price bids from all Authorized Buyers[.]”).

<sup>1066</sup> GOOG-DOJ-06882294, at -294 (“Increasing auction transparency for buyers and publishers is a key external pillar of the upcoming transition to unified 1P auction. For publishers, we announced this will translate into providing complete visibility into every single programmatic bid on every auction, through a new Bid Data Transfer file. The transparency pillar has been central to the messaging around 1P, and was integral to mitigating objections [by publishers] to some of the other changes we are rolling out as part of this migration.”).

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Manager 360 publishers will be able to get full visibility on all bids from all programmatic buyers (including bids from Google Ads and Display & Video 360).”<sup>1067</sup>

578) In parallel with the shift to the new form of BDT files, Google redacted and adjusted certain data fields in these files to prevent bids from being tied back to individual users.<sup>1068</sup> These changes, which were the result of contractual obligations and privacy considerations, made the new BDT files unjoinable with other auction data files that Google provides publishers.<sup>1069</sup> Recognizing that the

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<sup>1067</sup> GOOG-DOJ-AT-01906684, at -685.

<sup>1068</sup> Google’s Response to CMA Digital Advertising Market Study, GOOG-DOJ-AT-01916384, at -398 (“Google is subject to a buyer-imposed contractual restriction preventing it from disclosing buyer data to third parties in connection with non-winning bids if that data can be tied back to individual users”); GOOG-DOJ-AT-01906684, at -685; *see also* GOOG-DOJ-AT-00598885, at -885 (In Google messages from September 2019, Google states that “[w]ith the launch of the 1st price auction in Ad Manager, we will be making the Bids DT file generally available. At the same time, we need to make changes to the Bid DT file to comply with our contract with Amazon...Our contract with Amazon disallows sharing Amazon’s losing bids tied to user-identifiable information.”).

<sup>1069</sup> GOOG-DOJ-AT-01906684, at -689 (“In order to prevent bid data from being tied to individual users, publishers are not able to join the Bid Data Transfer file with other Ad Manager Data Transfer files. We need to balance publishers [sic] interests in increased transparency against our confidentiality obligations to buyers, as well as with user privacy considerations.”). Google discovered that contractual obligations to Amazon, an Authorized Buyer in AdX, prevented Google from sharing any user-identifiable data with publishers for queries in which Amazon lost the auction. GOOG-DOJ-AT-00598885, at -885 (“Our contract with Amazon disallows sharing Amazon’s losing bids tied to user-identifiable information.”).

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redaction and the resulting break in joinability<sup>1070</sup> would diminish the utility of data,<sup>1071</sup> Google included additional data fields to “make up for the reduced usefulness.”<sup>1072</sup>

579) By January 2020, Google included additional data fields based on closed beta feedback<sup>1073</sup> and allowed all remaining publishers on GAM360 to subscribe to the new BDT files at an additional monthly fee of \$1,200.<sup>1074</sup>

**2. Professor Gans’ Analysis of the Auction Data Fields that Google Offers its Customers Does Not Support a Conclusion that these Practices Anticompetitively Steered Customers to AdX**

580) Professor Gans alleges that Google’s redaction of key auction data represented a significant amount of lost information about header bidding to publishers.<sup>1075</sup> Professor Gans asserts that Google had “both the ability and the incentive to redact valuable data that would otherwise be available to

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<sup>1070</sup> Professor Pathak alleges that “[i]n addition, Google broke DFP publishers’ ability to measure the performance of Header Bidding. Google provides two types of data files to DFP publishers: Data Transfer files, which include Header Bidding bids, and a Bid Data Transfer file, which includes AdX and Exchange bidding bids, commonly referred to as ‘DT’ files. Google broke the link that allowed publishers to compare the results of these files.” (Pathak Report, at ¶150). Similarly, Professor Gans asserts that Google redacted a significant amount of information that allowed publishers to evaluate and compare the performance of their ad inventory across different ad exchanges. (Gans Report, at Section VII.D.1). For instance, Professor Gans states that “Google redacted valuable information that enabled publishers to evaluate and compare the performance of their inventory across different exchanges. Specifically, Google removed critical information from databases provided to publishers through DFP, rendering it impossible for publishers to know how much bidders on different exchanges were bidding for particular ad inventory, and impossible to evaluate the relative performance of exchanges more generally.” (Gans Report, at ¶677).

<sup>1071</sup> GOOG-DOJ-06882418, at -420 (“[T]o balance Amazon contractual requirements and our market commitment to provide complete transparency into the unified auction, we need to make changes... This involves breaking joinability between the Bid DT and other DT files and also redacting some fields (and adding back some others)... These changes reduce the usefulness of Bid DT file to inform pricing strategy (due to less inventory fields)”; GOOG-DOJ-AT-00598885, at -885 (“We will both break the intentionally deterministic join from Bids DT to the rest of DT, and reduce the accuracy of a probabilistic join. We will then add a few additional fields to the Bid DT file to make up for the reduced usefulness.”).

<sup>1072</sup> GOOG-DOJ-AT-00598885, at -885.

<sup>1073</sup> Those new fields were Country, CountryId, OSFamily, and DeviceFamily. (GOOG-DOJ-AT-01906684, at -685-686).

<sup>1074</sup> See, e.g., GOOG-DOJ-AT-00031508, at “Sell-side Rate Card” tab, cells B28-F28.

<sup>1075</sup> Gans Report, at Section VII.D.1. For instance, Professor Gans asserts that in 2019, Google changed the “KeyPart” field in Bid Data Transfer files and DT files, removing the ability for publishers to match the DT files to the BDT files to learn how much any given advertiser paid for the publisher’s inventory. (Gans Report, at ¶¶682-684). Professor Gans also asserts Google’s rounding of the BidPrice field to the nearest \$0.10 as well as truncating the Time and TimeUse2 fields represented lost information to publishers. (Gans Report, at ¶686).

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publishers”<sup>1076</sup> and that “the redaction of data made it impossible for publishers to compare performance across exchanges and therefore harmed competition in the exchange market.”<sup>1077</sup> Professor Gans thus gives the incorrect impression that Google provided certain information to publishers before 2019 and harmed competition by “redacting” some of that information after 2019. However, the record indicates that in 2019 Google began providing publishers with new information that they previously did not have access to, including additional information to “make up for” of certain redactions in the new dataset.<sup>1078</sup>

581) Professor Gans’ erroneous conclusion of anticompetitive harm is premised only on publishers’ inability to link this new information with other information to which publishers already had (and continue to have) access. Professor Gans’ support for his claims that the data eliminated publishers’ abilities to compare performance across exchanges appears to rely entirely upon an episode involving NewsCorp complaints in September and October 2019 (i.e., around the time of the BDT announcement).<sup>1079</sup>

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<sup>1076</sup> Gans Report, at ¶677.

<sup>1077</sup> Gans Report, at ¶695.

<sup>1078</sup> GOOG-DOJ-AT-00598885, at -885; GOOG-DOJ-AT-01906684, at -685 (Google added new fields to the BDT file, including AdUnitId, AdxAccountId, BidSellerReservePrice, LineItemId, MobileAppId, OptimizationType, OrderId, Country, CountryId, OSFamily, and DeviceFamily, to mitigate the impact of data redactions). The new data fields contain useful (for the publishers) information such as the per-buyer floor price from unified pricing rules, offered price for each bid after revenue sharing calculations, type of deal (e.g., private auction, preferred deal). By having access to the current version of DT files, publishers can retrieve full context of inventory and delivery attributes, allowing them to perform various analyses and make granular comparisons.

<sup>1079</sup> Gans Report, at ¶¶699-700 (“The notes further explain why the ability to join DT and BDT files is helpful for NewsCorp. This includes granularity of information, which negatively impacts yield.”). Yield is defined as “[t]he amount of revenue a Publisher is able to make from its inventory.” (Clearcode, “Yield,” available at: <https://clearcode.cc/glossary/yield/>. Accessed June 20, 2024. Additionally, yield management “generally refers to maximizing the revenue of publishers...” (Microsoft Platform, “Online advertising and Ad tech glossary,” February 13, 2024, available at: <https://learn.microsoft.com/en-us/xandr/industry-reference/online-advertising-and-ad-tech-glossary#s-z>. Accessed June 20, 2024).

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582) In reaching this conclusion, Professor Gans ignores that Google provides to publishers a wealth of information that allows them to “assess and compare performance across exchanges.”<sup>1080</sup> According to industry participants, Google’s DT files provide “an in-depth insight into all the bids submitted to a publisher’s auction” and allow a publisher to “create a complete bid landscape that shows a range of information about the number of bids received across dimensions like region, ad units, browsers, buyers, and so on.”<sup>1081</sup> An employee of Tercept, a platform for the monetization of ad data, published an article stating that “if used properly, Publishers can derive some really useful information or metrics and merge with various data forms to arrive at better and more efficient optimization solutions for their inventory.”<sup>1082</sup>

583) Google’s decision to increase the amount of information available to publishers in DT files, which provide granular auction- and impression-level data to publishers,<sup>1083</sup> reflects Google’s economic incentive to improve the performance of GAM across several dimensions. For example, based on the scope of the DT files that Google makes available to publishers, a wide range of granular analyses and comparisons can be performed, such as:

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<sup>1080</sup> Gans Report, at ¶695(a). For example, contrary to Professor Gans’ assertion (on page 235 of his report), sample extracts are available on the public-facing support page (Figure 168 shows several records from the sample file NetworkBackfillBids). The rows referring to BidBidder and Bid Buyer contain information from rival exchanges.

<sup>1081</sup> Header Bidding, “What is Log-level Data and How it Helps Publishers,” December 18, 2023, available at: <https://headerbidding.co/google-ad-manager-log-level-data/>.

<sup>1082</sup> Vinay Rao, “How Useful are Data Transfer Reports from Google Ad Manager?” Medium, available at: <https://medium.com/ad-optimization-insights-by-tercept/how-useful-are-data-transfer-reports-from-google-ad-manager-88dec10af20f>. Accessed April 27, 2024.

<sup>1083</sup> For example, these files “includ[e] the bid price, when the impression was served and the identity of the buyer.” (Google’s Response to CMA Digital Advertising Market Study, GOOG-DOJ-AT-01916384, at -38). *See* Google Ad Manager Help, “Ad Manager Data Transfer Reports,” available at: <https://support.google.com/admanager/answer/1733124>. Descriptions of fields and tables are available at Headerbidding, “What is Log-Level Data and How It Helps Publishers?” December 18, 2023, available at: <https://headerbidding.co/google-ad-manager-log-level-data/>.

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- All bids from Index Exchange in each Open Bidding auction versus all bids from PubMatic in each header bidding auction for ad impressions with the following combination of characteristics: displayed in desktops and mobile devices, displayed at Christmas noon, and displayed to users based in the United States.<sup>1084</sup>
- Winning bids from Open Bidding partners versus winning bids from header bidding partners for ad impressions with the following combination of characteristics: displayed in mobile web browsers on iPhones, displayed during the first half of December, and displayed to users based in New York and San Francisco.<sup>1085</sup>

584) Professor Gans ignores not only these elements of the record, but also fails to demonstrate empirically that redaction of auction reports in any way harmed competition. Professor Gans provides no evidence or analysis (i) suggesting that the average or median publisher in his candidate market earned less revenue, (ii) indicating the extent to which customers were “steered” to AdX as a result of redaction of data in auction reports, nor (iii) that assessing any “steering” toward AdX was sufficient to foreclosure of rivals’ ability to compete.

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<sup>1084</sup> This comparison can be performed by combining two data transfer files: NetworkBackfillBidsJoinable and NetworkBackfillBids. The following variables are relevant for the comparison: AdUnitId, BidPrice, TimeUse2, Country, BidSourceType, BidBidder, DeviceFamily. *See* Google Ad Manager Help, “Ad Manager Data Transfer reports,” available at: <https://support.google.com/admanager/answer/1733124?hl=en#zippy=%2Cabout-the-data-contained-in-data-transfer-files%2Cdownload-a-sample-file%2Cchow-files-are-delivered%2Cfile-names%2Cdata-transfer-files-in-the-ad-request-process%2Cstore-files-locally%2Clearn-about-the-bigquery-data-transfer-service%2Cmake-large-data-transfer-files-easier-to-process>. Accessed July 27, 2024.

<sup>1085</sup> This comparison can be performed by combining two data transfer files: NetworkBackfillBidsJoinable and NetworkBackfillImpressions. The following variables are relevant for the comparison: AdUnitId, BidPrice, TimeUse2, BidSourceType, CountryId, MobileAppId, City. *See* Google Ad Manager Help, “Ad Manager Data Transfer reports,” available at: <https://support.google.com/admanager/answer/1733124?hl=en#zippy=%2Cabout-the-data-contained-in-data-transfer-files%2Cdownload-a-sample-file%2Cchow-files-are-delivered%2Cfile-names%2Cdata-transfer-files-in-the-ad-request-process%2Cstore-files-locally%2Clearn-about-the-bigquery-data-transfer-service%2Cmake-large-data-transfer-files-easier-to-process>. Accessed July 27, 2024.



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**3. Professor Gans Ignores the Legitimate Business Rationales for Not Sharing Information about Individual Advertisers' Valuations for Publishers' Impressions**

585) Professor Gans' discussion of the "redaction" of auction data expresses a one-sided view from the perspective of publishers. Once again, Professor Gans ignores that Google operates a multi-sided platform that must balance the interests of publishers, advertisers, and users. While disclosing more advertiser and user information to publishers might seem to benefit publishers, it could erode the trust of advertisers and users to the detriment of an ad-supported open web. The record is consistent with Google considering the impact of its decisions on all sides of the multi-sided platform it operates.<sup>1086</sup>

586) The record indicates that Google had a legitimate business rationale for not allowing publishers to link the new data to other data sources that Google already provided. For example, Google is subject to a buyer-imposed restriction preventing it from disclosing buyer data to third parties in connection with non-winning bids if that data can be tied back to individual users.<sup>1087</sup>

587) Documents also indicate that Google decided to modify the data transfer files at least in part due to concern for consumer privacy. To protect these privacy interests, Google anonymized two fields in one dataset that prevented publishers from linking the new information at the bid level to other data that Google provided to publishers.<sup>1088</sup> Viewed in this context, such redaction is procompetitive because

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<sup>1086</sup> GOOG-DOJ-AT-01906684, at -690 ("[Google] need[s] to balance publishers [sic] interests without sharing data that third-party buyers may consider proprietary or that [it is] contractually prohibited from disclosing. Minimizing user data sharing is also another factor at play and is in line with the evolving privacy landscape (especially a design with new product features).").

<sup>1087</sup> Google's Response to CMA Digital Advertising Market Study, GOOG-DOJ-AT-01916384, at -398 ("Google is subject to a buyer-imposed contractual restriction preventing it from disclosing buyer data to third parties in connection with non-winning bids if that data can be tied back to individual users.").

<sup>1088</sup> Google's Response to CMA Digital Advertising Market Study, GOOG-DOJ-AT-01916384, at -398 ("The restrictions imposed on the new Bid Data Transfer file format were also prompted by user privacy considerations."). Anonymizing data in this fashion is common and used by government agencies. *See, e.g.*, United States Census Bureau, "Statistical Safeguards," available at:



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it gave ad buyers comfort that they could use Google's platform without sacrificing consumer privacy, which in turn allowed publishers to access third-party demand that may not have been available otherwise.<sup>1089</sup>

588) Google's redaction of certain auction data has a legitimate business rationale and is procompetitive because Google risks adverse bidder reaction to contractual and privacy violations.<sup>1090</sup> To the extent that more bidders are willing to transact ad impressions through Open Bidding because they perceive it as safe (for users) from a privacy perspective, Google's actions to ensure the privacy of users are procompetitive because they are demand-enhancing. By making Open Bidding attractive to bidders, Google increases the potential base of advertisers, which, in turn, increases attractiveness to publishers.

***4. Additional Evidence is Inconsistent with Google's Redaction of Auction Data Leading to Anticompetitive Effects***

589) First, I note that Professor Gans' opinion concerning the redaction of auction data appears to be that any conduct undertaken by a matching platform to protect the privacy of users due to

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[https://www.census.gov/about/policies/privacy/statistical\\_safeguards.html](https://www.census.gov/about/policies/privacy/statistical_safeguards.html). Accessed June 29, 2024 ("Before we publish any statistic, we apply safeguards that help prevent someone from being able to trace that statistic back to a specific respondent. We call these safeguards 'disclosure avoidance,' although these methods are also known as 'statistical disclosure controls' or 'statistical disclosure limitations.' Although it might appear that a published table shows information about a specific individual, the Census Bureau has taken steps to disguise the original data in such a way that the results are still useful. These steps include using statistical methods such as 'data swapping' and 'noise injection.'").

<sup>1089</sup> Without basis, Gans claims that this privacy motivation was pretextual. Gans Report, at Section VII.D.2.

<sup>1090</sup> Joining such comprehensive bid files with content viewer data from other DT files would enable publishers to see multiple advertiser attempts to target a specific content viewer at a specific location (at postal code level), including all failed attempts (i.e., lost bids), which in turn could allow creation of substantially more detailed content viewer-specific profiles. For instance, a publisher may observe a notebook manufacturer win an impression when a content viewer visits a website and infer that the content viewer is interested in notebooks; this is inevitable because the notebook ad appears on the publisher's website. But consider a hypothetical where the publisher could also see all losing bids for that specific impression. It could then observe that a travel services provider, a vehicle manufacturer, medical services provider, and a restaurant chain all bid highly for the same impression, giving the publisher the ability to infer, in one instant, and use for its own targeting purposes, a far more complete picture of the content viewer and his/her interests.

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contractual obligations and privacy considerations is potentially anticompetitive conduct that forecloses competition from other matching platforms. As a matter of economics, this opinion is plainly incorrect as platforms function by creating and enforcing rules on all users, regardless of which side of the platform they transact from, to ensure the platform is attractive and facilitates transactions, thereby increasing the sales of services through its platform. Google has an incentive to attract bidders to its Open Bidding platform by explaining why it redacts certain auction data to protect the privacy of users, encouraging them to transact through Open Bidding. As explained in the previous section, Google's challenged conduct was consistent with procompetitive practices. This means that Google's decision to redact certain auction data fields did not aim to harm header bidding exchanges.

590) Even accepting Professor Gans' assertion that, beginning in 2019, Google "redacted" information that publishers previously enjoyed, the record is inconsistent with this information being valuable to a typical publisher. Documents and data indicate that, at most, [REDACTED] of U.S. publishers using AdX actually used the data in question.<sup>1091</sup> Google's internal documents show that by June 2019, only about [REDACTED] subscribed to BDT as a paid feature.<sup>1092</sup> Google data show that 243 Premium AdX U.S. publishers made at least one payment attributed to data transfer fees from January 2014 to June 2023.<sup>1093</sup>

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<sup>1091</sup> See Figure 169. The total number of U.S. premium publishers with payments attributed to data transfer fees is 243. Moreover, data show that 3,784 U.S. publishers used AdX at any point in time during the sampled period.

<sup>1092</sup> An internal Google document from June 2019 states that "[REDACTED] currently subscribe to Bid DT as a paid feature." (GOOG-DOJ-06882294, at -294). See also GOOG-DOJ-AT-02321125, at -127 (an internal Google document last updated in August 2020 stating that "[t]here are [REDACTED] who currently use the Bid DT file as part of the Bid DT beta.").

<sup>1093</sup> Note that these data likely account for publisher access to data transfer files that do not relate to the allegedly redacted auction data. Indeed, these fees are observed as far back to even five years before the issues to this claim were available. Figure 170 shows the pattern of these data purchases over time.

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591) Data are inconsistent with Professor Gans' theory that redaction of certain auction data steered customers to Google or otherwise deprived rivals of business. As shown in the data, from September 2019 through March 2023, the number of ad impressions transacted via header bidding by Google publishers (i.e., publishers who use Google's DFP ad server) has increased from slightly below [REDACTED] to slightly above [REDACTED] per month.<sup>1094</sup> Similarly, data show among all publishers who use AdX to sell their ad inventory, the fraction of publishers using header bidding remained relatively constant (around [REDACTED]) during the same time span.<sup>1095</sup> These data undermine Professor Gans' wholly unsupported assertion that Google's redaction of key publisher data fields "harmed competition amongst exchanges, as publishers simply could not evaluate their options of where to sell their inventory without this information."<sup>1096</sup>

592) Other data are also inconsistent with Professor Gans' conclusion that Google harmed rivals or competition by redacting certain auction data. From September 2019 through February 2023, the average number of header bidding exchanges used by AdX and DFP publishers has increased from [REDACTED] to [REDACTED]. Moreover, as depicted in the data, various ad exchanges have witnessed an increase in the number of publishers that use their services.<sup>1098</sup> For instance, the number of Google publishers utilizing Microsoft's Xandr exchange for their display ad transactions has increased from about [REDACTED] in September 2019 to nearly [REDACTED] in February 2023. Likewise, the number of AdX and DFP publishers utilizing Sovrn

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<sup>1094</sup> See Figure 165.

<sup>1095</sup> See Figure 146.

<sup>1096</sup> Gans Report, at ¶677.

<sup>1097</sup> See Figure 167.

<sup>1098</sup> See Figure 171.

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for their display ad transactions has increased from [REDACTED] in September 2019 to around [REDACTED] in February 2023. Also, as can be seen from the data, the number of distinct header bidding exchanges used by Google's AdX and DFP publishers has remained relatively constant after 2019 (with minor fluctuations over time).<sup>1099</sup>

593) As I have already demonstrated, data are inconsistent with anticompetitive harm, steering, and foreclosure. Data also show robust increases in header bidding, which is inconsistent with the economic mechanism through which this business practice allegedly steered customers to Google.<sup>1100</sup>

**XII. GOOGLE DID NOT ENGAGE IN ANTICOMPETITIVE "AUCTION MANIPULATION"**

594) Professor Gans characterizes Project Bernanke and Dynamic Revenue Share (DRS) as "auction manipulations, the purpose and effect of which was to make it harder for non-Google incumbents and new entrants to compete at various levels of the advertising stack including, most notably, the exchange market."<sup>1101</sup> He asserts that "these conduct all amount to a similar thing: to reduce the flow of transactions to Google's rivals, both actual and potential."<sup>1102</sup> I disagree with these depictions.

595) I note at the outset that Professor Milgrom has evaluated Google's Bernanke and DRS business practices in the context of auction efficiency. With respect to Bernanke, Professor Milgrom concludes that it: (a) increased the total value of impressions won by Google Ads advertisers and their

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<sup>1099</sup> See Figure 172.

<sup>1100</sup> See Figure 165

<sup>1101</sup> Gans Report, at ¶702.

<sup>1102</sup> Gans Report, at ¶703.

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surplus, (b) did not increase Google Ads' revenue share per impression, (c) increased publisher revenue and decreased unsold impressions, and (d) did not rely on Google Ads having special access to sell-side data that was unavailable to other bidders.<sup>1103</sup> With respect to DRS, Professor Milgrom concludes that: (a) it benefited publishers by allowing them to sell more inventory and increase revenue, (b) it expanded output by reducing unsold impressions, (c) when it enabled AdX to win over third-party exchanges, it did so by providing higher revenue to publishers, (d) Google experiments show DRS v2 increased publisher revenue, (e) it did not increase Google's average revenue share, and (f) it did not rely on AdX's scale.<sup>1104</sup> Professor Milgrom's conclusions indicate that these innovations would have resulted in Google attracting customers from rivals simply because it creates a better value proposition (e.g., created a large pie from which all stakeholders stood to benefit). Despite Professor Gans' unsupported characterization of these innovations as "auction manipulations," they are not anticompetitive because customers benefited, output increased, and they were profitable for Google purely on the merits of the value added from these practices.<sup>1105</sup> As I have emphasized throughout this report, documents and data—including contemporaneous Google analyses of the effects of Bernanke and dynamic revenue share—are consistent with Professor Milgrom's conclusions: prices for ad tech did not increase despite significant increases in demand and quality improvements.

596) Professor Gans' theory of harm is based on his belief that Bernanke and DRS introduced a lack of transparency that made it difficult for Google's customers to know *what price they were*

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<sup>1103</sup> Milgrom Report, at ¶¶138, 161-166, 175.

<sup>1104</sup> Milgrom Report, at ¶¶419-449, 470.

<sup>1105</sup> Thus, the benefits here do not rely on future benefits of less competition.

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*paying*.<sup>1106</sup> But Professor Gans does not provide a sound economic explanation for why the information he claims that Google conceals would materially impact competition. Professor Gans' mistake stems from his assumption that Google's customers are purchasing ad tech "tools."<sup>1107</sup> As I have emphasized, the actual products being bought and sold are matched impressions. Because Google discloses to its customers that the actual amounts they pay are based on the outcomes of auctions, and that at the end of each month they will be provided an accounting of the amounts they pay or receive, customers are provided with all of the relevant price information they need from Google in order to comparison shop with competitive alternatives to Google's services.

597) With the transaction prices that Google provides, advertisers can assess the ROI of their ad spend, and with the payments publishers receive, they can assess their content's yield in aggregate or on a per impression basis. There is no meaningful lack of transparency.

598) Thus, for example, Professor Gans' assertion that "[t]hrough Bernanke, Google could overcharge advertisers the GDN take rate for low-demand impressions"<sup>1108</sup> does not imply harm to advertisers or competition. More broadly, if auction efficiencies related to Bernanke and DRS increased the overall size of the pie, even if Professor Gans had shown that Google's margins increased (which he has not), this would not imply that advertisers or publishers were harmed (e.g., were subjected to lower

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<sup>1106</sup> Gans Report, at ¶703.

<sup>1107</sup> Professor Gans defines publisher ad servers as "tools that help publishers track, manage and sell their inventory in an automated fashion and maximize their yield." (Gans Report, at ¶62). He refers to AdX, as Google's "ad exchange tool." (Gans Report, at ¶180). He also defines relevant markets for buy-side ad tech products in terms of "ad buying tools." (Gans Report, at ¶¶224, 277).

<sup>1108</sup> See Gans Report, at ¶729.

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ROIs or yields) because, with a larger pie, customers may still end up with bigger pieces than they would have had but-for Bernanke and DRS.

599) In the remainder of this section, I explain why Professor Gans' analyses of Bernanke and DRS are flawed and do not support his conclusion that these features harmed competition, publishers, or advertisers. I instead conclude that the documents and data show that Bernanke and DRS are procompetitive innovations that increased the quality and frequency of ad matches and thereby benefited publishers and advertisers.

**A. Bernanke Was a Legitimate Business Innovation that Did Not Harm Competition**

***1. Background on Bernanke***

600) Google Ads executes digital campaigns for its advertiser customers by formulating and submitting bids to auctions on their behalf. In this subsection, I describe Google Ads' formulation and submission of bids prior to 2013 and explain how it changed with the implementation of Bernanke in 2013 and Global Bernanke in 2015.<sup>1109</sup>

601) Google Ads formulates bids through a multi-step process. When an impression becomes available, Google Ads first solicits bids from its advertisers in an internal auction designed to identify each advertiser's "value," or the maximum they are willing to pay, for the impression.<sup>1110</sup> Advertisers typically bid on a cost per click (CPC) basis, but AdX auctions are conducted on a per-impression

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<sup>1109</sup> Note that some internal documents refer to Global Bernanke as Project Bell v1 and Project Bell as Bell v2.

<sup>1110</sup> Google Ads Help, "Cost-per-click (CPC): Definition," available at: <https://support.google.com/google-ads/answer/116495?hl=en>. Accessed August 2, 2024 ("Cost-per-click (CPC) bidding means that you pay for each click on your ads. For CPC bidding campaigns, you set a maximum cost-per-click bid - or simply 'max. CPC' - that's the highest amount that you're willing to pay for a click on your ad (unless you're setting bid adjustments, or using Enhanced CPC).").

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basis.<sup>1111</sup> Thus, Google Ads next converts advertisers' maximum CPC bids to "maxEcpm," or maximum expected cost per mille, using estimated click rates for the impression.<sup>1112</sup> Finally, Google Ads determines the winning and second place advertisers on the basis of their maxEcpm and other factors and submits bid(s) to AdX.<sup>1113</sup> Up until 2019, AdX conducted second-price auctions, so Google Ads submitted two bids to AdX.<sup>1114</sup> The "high bid" was a function of the willingness to pay of the highest bidder, and the "low bid" was a function of the willingness to pay of the second-highest bidder, ensuring Google Ads bidders faced the incentives of a second-price auction.<sup>1115</sup>

602) Specifically, prior to 2013, Google Ads submitted high and low bids to AdX based on the values of the highest and second-highest bidders revealed in its internal auction and a fixed Google Ads revenue share.<sup>1116</sup> Google Ads set the high bid equal to the maxEcpm of the highest bidder (less its [REDACTED] revenue share) and the low bid equal to the maxEcpm of the second-highest bidder (less its [REDACTED] revenue share).<sup>1117</sup> According to AdX rules at the time, the winner of the AdX auction paid the

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<sup>1111</sup> Advertisers can also choose other pricing models that are based on conversion, engagement, or active view. *See* GOOG-DOJ-09506280<sub>2</sub> at -282 ("Advertisers can pay per [c]lick; [c]onversion; [e]ngagement; [a]ctive [v]iew; TrueView (video).").

<sup>1112</sup> Google Ads uses the pCTR to "convert[] all bids to [the] max expected cost per 1000 imp[ression]s (maxEcpm)" by calculating "1000\*maxCPC\*pCTR." (GOOG-DOJ-09506280<sub>2</sub> at -282).

<sup>1113</sup> The final auction score is determined by a function of max expected cost per 1000 impressions (maxEcpm) as well as third-party data fees and quality adjustments including mute-based fees. Google Ads also takes into account "the best configuration of ads" for the placement. (GOOG-DOJ-09506280, at -283).

<sup>1114</sup> After 2019 when AdX became a first price auction, Google Ads redesigned its bidding algorithms through Project Alchemist. *See* GOOG-DOJ-14550102, at -102 ("Alchemist is a mechanism that: ... [s]ubmits first price bids to publishers (while being truthful from buyer's perspective)").

<sup>1115</sup> GOOG-DOJ-11900049, at -055 ("Lowering revenue share, both buy-side and sell-side, may incentivize publishers to raise their min-cpm to eat Google revenue. However, they can not do it per query (per query min-cpm threshold is typically another network offer).- ... Lowering buy-side revenue share should incentivize higher bid from other Adx buyers. + ... Dynamic revenue share in the sell-side moves us one step away from typical second price auction. Basically, the cost for the winner depends on its bid.").

<sup>1116</sup> GOOG-DOJ-04306227, at -227 ("In this case, GDN first holds its own auction and submits the leading 2 bids to the AdX auction. Historically, GDN applied a [REDACTED] revshare to these bids and AdX applies a [REDACTED] sell-side revshare to all bids in their auction.").

<sup>1117</sup> Mathematically, the high bid would be set to  $(1-0.14)*\text{maxEcpm}$  for the high bidder and the low bid to  $(1-0.14)*\text{maxEcpm}$  for the second-highest bidder. (GOOG-DOJ-13551015, at -016.).



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higher of the second-highest bid to AdX and the publisher's price floor, which I refer to as the "auction price."<sup>1118</sup> In the event the highest Google Ads bidder won the AdX auction, it paid a gross price equal to the auction price plus Google Ads' revenue share, calculated as the auction price divided by [REDACTED].<sup>1119</sup> If Google Ads' low bid was above both the price floor and the bids of all other AdX bidders, the auction price equaled Google Ads' low bid. In this case, the AdX winner (i.e., the highest Google Ads bidder) paid the maxEcpm of the second-highest Google Ads bidder (i.e., it paid the low Google Ads bid divided by [REDACTED]).<sup>1120</sup>

*a. Bernanke*

603) In November 2013, Google Ads implemented a buy-side optimization known as "Project Bernanke."<sup>1121</sup> Bernanke aimed to further increase the rate at which Google Ads advertisers won AdX auctions while maintaining Google Ads' average revenue share at [REDACTED].<sup>1122</sup> Bernanke

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<sup>1118</sup> Declaration of N. Korula, August 4, 2023, GOOG-AT-MDL-008842393, at ¶5. The auction price equaled Google Ads' low bid only if the low bid was above both the price floor and the bids of all other advertisers. In this case, the advertiser paid the maxEcpm of the second-highest Google Ads bidder. To see this note that the low bid is equal to  $0.86 * \text{maxEcpm}$  of the second-highest bidder. Grossing the low bid up by the 14 percent revenue share results in the advertiser paying the maxEcpm of the second-highest bidder. Mathematically,  $(\text{low bid} / (1 - 0.14)) = ((1 - 0.14) * \text{maxEcpm}) / (1 - 0.14) = \text{maxEcpm}$ . (GOOG-DOJ-09714662, at -662).

<sup>1119</sup> GOOG-AT-MDL-B-007779042, at - 042; GOOG-DOJ-13605152, at -153. To illustrate this process, suppose two Google Ads bidders reveal maxEcpms of \$4 and \$2 for an impression with a price floor of \$1. Prior to 2013, Google Ads would submit a high bid of \$3.44 and a low bid of \$1.72 to AdX on behalf of these advertisers. If the Google Ads bids were the two highest bids in the AdX auction, the auction price would be \$1.72, the advertiser would pay \$2, and Google Ads would receive \$0.28 in revenue share.

<sup>1120</sup> To see this note that the low bid is equal to  $0.86 * \text{maxEcpm}$  of the second-highest bidder. Grossing the low bid up by the 14 percent revenue share results in the advertiser paying the maxEcpm of the second-highest bidder. Mathematically,  $(\text{low bid} / (1 - 0.14)) = ((1 - 0.14) * \text{maxEcpm}) / (1 - 0.14) = \text{maxEcpm}$ .

<sup>1121</sup> Declaration of Nirmal Jayaram (August 5, 2023), GOOG-AT-MDL-008842383, ¶ 9; GOOG-DOJ-07824949, at tab "ref all 2013 launches," cell E214, J214.

<sup>1122</sup> GOOG-DOJ-13469175, at -175 ("This is done in such a way that GDN profit is maximized while also ensuring fair GDN payout to the exchange/ publisher. Here, fairness is defined as ensuring the desired margin on the GDN payout. For instance, for non-video requests, this implies retaining only \$0.14 on average for every \$1 revenue."); GOOG-AT-MDL-B-002088410, at -410 ("With this launch, GDN wins more auctions and generates more revenue at the same average 14% revshare; GDN's advertisers win more auctions and get greater click/conversion volume; and AdX publishers enjoy higher match rate and revenue.") .

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accomplished this by adjusting both the high and the low bids it submitted to AdX.<sup>1123</sup> Under Bernanke, Google Ads reduced the maxEcpm of the highest bidder by less than [REDACTED] when submitting the high bid, resulting in a decreased revenue share to Google Ads.<sup>1124</sup> Further, under Bernanke Google Ads also reduced the maxEcpm of the second-highest bidder by more than [REDACTED] when submitting the low bid, resulting in an increased revenue share to Google Ads.

604) Contrary to Plaintiffs' and Professor Gans' assertions, Bernanke did not drop the second-highest bid from the AdX auction.<sup>1125</sup> Instead, Bernanke programmatically set Google Ads' high and low bids based on optimization routines designed to maximize the value of auctions won by its advertisers on AdX.<sup>1126</sup> Bernanke did not rely on data from any Google products other than Google Ads. Google Ads conducted experiments to collect the information it required.<sup>1127</sup> By submitting strategic

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<sup>1123</sup> GOOG-AT-MDL-B-002080547 ("Project Bernanke involves reducing the second price and increasing the first price of the two bids submitted by GDN to the AdX auction in such a way that publishers receive fair payout (e.g. GDN margin remains constant) and GDN profit is maximized. The optimal and fair combination of first bid increase and second bid decrease for each publisher is estimated using AdX auction simulations. . . .").

<sup>1124</sup> GOOG-DOJ-12700489, at -493.

<sup>1125</sup> Fourth Amended Complaint, at ¶303. *See* Gans Report, at ¶741 ("[W]hen GDN second bids itself, Bernanke kicks in to deflate or drop the second bid, and the GDN advertiser pays the original second price."). *See also* Pathak Report, at ¶183 ("For Project Bernanke, Google Ads decreased or completely dropped the second bid it submitted to AdX in auctions where it predicted that it would submit the highest and the second highest bid, decreasing the clearing price.").

<sup>1126</sup> GOOG-DOJ-28385887, at -893. As a Google engineer described the changes Bernanke implemented in his deposition: "A: The launch of Bernanke did not affect the pricing mechanism for these advertisers. Q: When you say that the pricing mechanism wasn't changed, what do you mean by that? A: That the Google Ads auction internally continued to function as a second-price auction, so the advertiser would pay the -- would pay based on the second bid of that auction." (Deposition of [REDACTED] (Google) on April 3, 2024 (hereafter "[REDACTED] (Google) Deposition"), at 180:8-19).

<sup>1127</sup> GOOG-DOJ-13469175, at -176 ("In order to gather data for running the auction simulations, a 1% background experiment is run where every top GDN bid is quadrupled, and the second bid dropped. In this experiment, on queries GDN wins, it can be inferred that the second price is the price that GDN needs to beat in order to win the auction. Now, we can determine, if instead of quadrupling the bid, we could have, for instance, tripled the bid and still won this auction. We pick various bid multipliers between 1 and 4 and evaluate whether GDN will win that query at each of these bid multipliers. On queries won by GDN at any bid multiplier, the payouts to the exchange and the publisher are then computed for various second bid reductions from 0 to 1. Using this mechanism, we estimate the queries GDN will win, the associated revenue, payout, etc., on all queries of this background experiment for various combinations of first bid increase and second bid decrease. It is important to note that in this entire process, we only use information about the GDN bid and the GDN price paid on queries won by GDN. In other words, we do not use any AdX buyer information.").

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bids to AdX in a small fraction of the auctions it participated in, Google Ads could determine historical high bids and price floors and use this information to set bids.<sup>1128</sup>

*b. Global Bernanke*

605) In August 2015, Google Ads replaced Bernanke with Global Bernanke.<sup>1129</sup> A stated goal of Global Bernanke was to “increase conversion volume” by enabling Google Ads advertisers to win impressions with high rates of content viewer engagement.<sup>1130</sup> To do this, Global Bernanke implemented two changes. First, it loosened the constraint that Google Ads’ revenue share had to average [REDACTED] for each publisher.<sup>1131</sup> By loosening this constraint, Google Ads was able to win additional auctions on behalf of its advertisers.<sup>1132</sup> Second, Global Bernanke implemented an objective function based on

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<sup>1128</sup> GOOG-DOJ-06842351, at -359 (An internal Google presentation describes that Project Bernanke was implemented by “[d]evelop[ing] [an] auction simulator to determine ideal first bid increase and second bid reduction to maximize GDN profit ... [Google] respect[s] GDN-AdX firewall: [Google] only utilize[d] GDN data to optimize bidding strategy. Any AdX buyer can do this.”); GOOG-AT-MDL-B-002080547 (“The optimal combination of first bid increase and second bid decrease for each publisher is estimated using AdX auction simulations.”).

<sup>1129</sup> Declaration of Nirmal Jayaram (August 5, 2023), GOOG-AT-MDL-008842383, at ¶10; GOOG-DOJ-07824949, at tab “ref all 2015 launches,” cell K444.

<sup>1130</sup> GOOG-DOJ-04320717, at -717.

<sup>1131</sup> GOOG-DOJ-14161943, at -943. (“Global Bernanke is an extension of project Bernanke in which GDN retains a [REDACTED] margin on AdX as a whole, while deviating from [REDACTED] on individual publishers.”). This change is further described in a Google engineer’s deposition: “A: In Bernanke V.1, margin constraints were on a per-publisher basis. With Global Bernanke, margin constraint was at a global level, although with per-publisher constraints as well. Q: And when you say that there was -- margin constraints were on a per-publisher basis, there’s some fluctuation in whether a publisher is making more or less as a result of Bernanke, right? A: The main difference between V.1 and Global Bernanke is, again, that the margin constraint was at a global level. As a result, the margins seen on the particular publisher was not set to be a particular target but could have a range of margins, so it could be higher or lower than average.” [REDACTED] (Google) Deposition, at 296:15-297:12).

<sup>1132</sup> GOOG-DOJ-04320717, at -717-718.

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maximizing conversion volume, or rates of user engagement with the ad, rather than impression volume.<sup>1133</sup> Like Bernanke, Global Bernanke increased surplus for Google advertisers.<sup>1134</sup>

606) Professor Gans claims that Global Bernanke increased the bids of Google Ads advertisers who were not only close to publishers' price floors but also to floors set by DFP.<sup>1135</sup> Again, Professor Gans does not explain how this would have caused harm to market participants or to competition. Global Bernanke increased high bids with the goal of increasing win rates, and it is immaterial whether it increased win rates by bidding above competitors' bids, publisher's price floors, or DFP's price floors. The information Google Ads used to determine the competitiveness of an impression was derived from experiments it conducted on a small fraction of auctions it participated in.

***2. Professor Gans' Analysis Does Not Show Bernanke Harmed Competition***

607) Professor Gans asserts that "Google implemented Bernanke to override publishers' high floors on AdX."<sup>1136</sup> This is not the case. Bernanke increased bids in an attempt to bid above price floors but did not override them. In fact, because AdX (and not Google Ads) determines the winner of auctions, there is no way Bernanke could have overridden floors. If Google Ads submitted a high bid below a publisher's price floor, AdX would have selected another winner or allowed the impression to go unsold.

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<sup>1133</sup> GOOG-DOJ-04320717, at -717 ("The current Bernanke increases the AdX win rate from [REDACTED] and increases revenue by [REDACTED]. By removing the fixed publisher margin constraint we can increase the conversion volume for advertisers and increase GDN revenue by up to [REDACTED] overall resulting in the AdX win rate going up to [REDACTED] (match rate = [REDACTED]).

<sup>1134</sup> GOOG-DOJ-04320717, at -717-718 ("By removing the fixed publisher margin constraint we can increase the conversion volume for advertisers ... we feel that overall this is a very good change for the network - particularly for our advertisers.").

<sup>1135</sup> See Gans Report, at ¶¶738, 742, 759 ("In this auction scenario, when the publisher's floor price is higher than all submitted bids, Bernanke inflates the GDN bid to be higher than the floor price."); See Gans Report, at ¶743, ("However, in the third possible scenario, Bernanke appropriates the impression away from the non-Google advertiser. When a non-GDN buying tool offers the highest bid, Bernanke kicks in to inflate the Google bid.").

<sup>1136</sup> Gans Report, at ¶737.

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Even assuming Professor Gans' erroneous interpretation is correct, this does not, on its own, imply anticompetitive harm. Professor Gans provides no empirical evidence to support his assertion that Bernanke harmed publishers.

608) Professor Gans' conclusion that "Projects Bernanke and Global Bernanke harmed publishers by reducing the effectiveness of monetization of their inventory"<sup>1137</sup> is similarly unsupported. Professor Gans' description of an episode related to the New York Times does not rise to the level of market impact and is inconsistent with his theory that Bernanke was driven by anticompetitive intent as Professor Gans claims.<sup>1138</sup> To the extent that Bernanke had unintended consequences for The New York Times, the record he describes indicates that Google worked to help solve the problem.<sup>1139</sup>

609) Professor Gans also mischaracterizes the impact of Bernanke on Google advertisers, suggesting that it could result in advertisers being overcharged in certain scenarios.<sup>1140</sup> Bernanke altered auction outcomes in three possible scenarios: (a) the Bernanke high bid can lead a Google Ads advertiser to win a transaction they otherwise would not have won; (b) the Bernanke high bid can raise the auction price if it is the auction clearing price; and (c) the Bernanke low bid can lower the auction price if it is the auction clearing price. In Scenario (a), Bernanke benefits Google advertisers, because Bernanke's rules ensure the gross price does not exceed the winner's value for the transaction. In Scenario (b), Google advertisers are unaffected. They do not pay the higher auction price, because a third-party high

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<sup>1137</sup> Gans Report, at Section VIII.B.3.

<sup>1138</sup> Gans Report, at ¶¶718, 760-764.

<sup>1139</sup> For example, *see* Gans Report, at ¶764 ("As a response to The New York Times' escalation, Google manually blacklisted and suspended accounts that propagated harmful ads.")

<sup>1140</sup> Gans Report, at ¶773 ("At the same time, Bernanke harmed advertisers by overcharging them in low-demand auctions.).

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bidder wins the auction in this case. In Scenario (c), Google advertisers are unaffected. Even when a Google advertiser wins the auction at the price of the low bid, they pay no more for the impression than they would have paid without Bernanke.<sup>1141</sup> Professor Gans provides no empirical evidence to support his assertion that Bernanke harmed advertisers.<sup>1142</sup>

610) Finally, Professor Gans also asserts that Bernanke and Global Bernanke harmed rivals because “Google designed Bernanke to enable GDN to win more auctions”<sup>1143</sup> and that “GDN won more auctions without improving price or quality”<sup>1144</sup> under Bernanke and Global Bernanke. The documents he cites do not support this assertion. Indeed, the only statement Professor Gans points to in relation to a potential harm to competition is an unsupported statement that “GDN profits rose by [REDACTED] or nominally, [REDACTED] per year. Rival buying tools realized an [REDACTED] decrease in spending, equivalent to a [REDACTED] decrease per year... Hence, Bernanke improved Google’s bottom line at the expense of rival buying tools.”<sup>1145</sup>

611) Ignoring the fact that Professor Gans has not offered evidence of a causal link between Bernanke and these data points, basic economics indicate that these data do not imply anticompetitive harm. Competition typically results in one firm gaining business at the expense of rivals. Second, his

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<sup>1141</sup> [REDACTED]

<sup>1142</sup> Gans Report, at ¶773 (“At the same time, Bernanke harmed advertisers by overcharging them in low-demand auctions.”).

<sup>1143</sup> Gans Report, at ¶744.

<sup>1144</sup> Gans Report, at ¶¶749, 752.

<sup>1145</sup> Gans Report, at ¶750.

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numbers imply that the increased value created by Bernanke is almost twice as large as the ad spend lost by rivals. Stated differently, Professor Gans' own numbers imply that the overall quality-adjusted value of impressions in his candidate markets increased as a result of Bernanke.<sup>1146</sup>

612) Professor Gans fails to recognize that innovation and investments in features like Bernanke are part of the competitive landscape in ad tech. And he ignores that Google was not in a unique position to introduce features like Bernanke into ad tech components like Google Ads. Documents indicate that Google developed Bernanke without leveraging any information that did not already reside with Google Ads (i.e., it did not rely on AdX data).<sup>1147</sup> This means that Google Ads' rivals could have implemented similar programs, and in fact, some rivals did offer competing solutions.<sup>1148</sup>

613) In sum, Professor Gans does not provide any empirical evidence to support his assertions that Bernanke adversely impacted advertisers, publishers, or competition. He does not examine actual prices or quality of Google Ads. As I explained in Section VII.B as well as shown by data, Google's margin on Google Ads has not increased, despite increases in quality.<sup>1149</sup>

**3. Bernanke was Procompetitive and Benefited Both Advertisers and Publishers**

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<sup>1146</sup> Assuming Google Ads earns a margin of [REDACTED] across the entire ad tech stack, and the [REDACTED] in profits relate to that margin, Professor Gans' observation implies that Bernanke increased the value of ads sold on Google Ads by [REDACTED] and [REDACTED] came at the expense of sales of rivals. Thus, the size of the pie increased by [REDACTED]. In other words, advertisers and publishers had more surplus to split, which is consistent with data which indicates they made more money.

<sup>1147</sup> A Google document from the launch confirms that there was a firewall between Google Ads and AdX. It states, "We respect GDN-AdX firewall: we only utilize GDN data to optimize bidding strategy. Any AdX buyer can do this." (GOOG-DOJ-06842351, at -359). Similarly, another Google document explains that the Bernanke algorithm relied only on GDN data: "It is important to note that in this entire process, we only use information about the GDN bid and the GDN price paid on queries won by GDN. In other words, we do not use any AdX buyer information." (GOOG-DOJ-13469175, at -176).

<sup>1148</sup> [REDACTED]

<sup>1149</sup> See Exhibit 6 and Figure 103.

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614) Internal Google studies indicate that the Bernanke programs benefitted advertisers.<sup>1150</sup> Prior to Bernanke's launch in November 2013, experimental studies showed that as a result of Bernanke, Google Ads' ability to clear publisher reserve prices improved, increasing its match rate on AdX by [REDACTED] and resulting in a slightly over [REDACTED] increase in the number of impressions won by Google Ads' advertisers.<sup>1151</sup> An intermediate launch study also showed increases in conversion volume by [REDACTED].<sup>1152</sup> Roughly a year and a half after launch, Google assessed that Bernanke was responsible for increasing its advertisers' win rate by [REDACTED].<sup>1153</sup> Internal studies also found that Global Bernanke increased win rates for advertisers.<sup>1154</sup>

615) Google documents suggest that Bernanke also benefitted publishers. Prior to the launch, studies predicted that Bernanke would increase publisher revenue by between [REDACTED].<sup>1155</sup> Studies after the launch found that publisher benefits were realized. An early 2014 analysis indicated that Bernanke increased publisher revenue by [REDACTED] in mobile and [REDACTED] in all traffic.<sup>1156</sup> A

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<sup>1150</sup> GOOG-DOJ-12700489, at -494.

<sup>1151</sup> GOOG-DOJ-12700489, at -494.

<sup>1152</sup> GOOG-DOJ-12700489, at -501.

<sup>1153</sup> GOOG-DOJ-04320717, at -717.

<sup>1154</sup> GOOG-DOJ-15637938, at -938 (An internal Google document from Q2 of 2015 indicates that Global Bernanke expected to result in a [REDACTED] increase in "GDN win rate"); GOOG-DOJ-04320717, at -717 ("The current Bernanke increases the AdX win rate from [REDACTED] to [REDACTED] (match rate = [REDACTED] and increases revenue by [REDACTED]. By removing the fixed publisher margin constraint we can increase the conversion volume for advertisers and increase GDN revenue by up to [REDACTED] overall resulting in the AdX win rate going up to [REDACTED] (match rate = [REDACTED]").

<sup>1155</sup> GOOG-DOJ-13469175, at -177 (An internal Google document titled "Bernanke experiment analysis" shows that in the "pool unconstrained experiment ... [pub]lisher revenue [was expected to increase by] [REDACTED] GOOG-DOJ-12700489, at -493 (An internal Google presentation from October 2013, notes "Experiment Results" where the "[pub]lisher revenue [increased by] [REDACTED] GOOG-DOJ-06842351, at -362 ("Overall Bernanke Impact[: ] Pub[lisher] revenue + [REDACTED]").

<sup>1156</sup> GOOG-DOJ-13513528, at tab "Summary", cells B9:C9.



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November 2014 presentation stated that Bernanke increased revenue by [REDACTED].<sup>1157</sup> A February 2015 experiment found that Bernanke increased publisher revenue by approximately [REDACTED].<sup>1158</sup>

616) Other Google documents also suggest that Global Bernanke benefitted publishers, including by increasing publisher revenue.<sup>1159</sup> Another Google document at the time expected Global Bernanke to increase publisher revenue by approximately [REDACTED].<sup>1160</sup> After the launch in July 2015, an experiment showed that Global Bernanke increased publisher revenue by an average of [REDACTED] or [REDACTED]/year.<sup>1161</sup> Moreover, data are inconsistent with Bernanke or other Google business practices reducing the overall quality of Google Ads.<sup>1162</sup>

617) Finally, Google data are inconsistent with Professor Gans' assertion that Google used Bernanke to achieve its alleged goal of foreclosing ad buying tool competition.<sup>1163</sup> Google AdX data

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<sup>1157</sup> GOOG-DOJ-03901693, at -702.

<sup>1158</sup> GOOG-TEX-00776740, at Summary tab, cells B5:C5. Further, in deposition of a Google engineer, [REDACTED], he explains that "[o]n some queries the lower second bid can result in a lower clearing price. However, the other part of the Bernanke mechanism is to increase the first bid which will win additional queries for Google Ads advertisers and as a result also increase the clearing price that results from the AdX auction, thus resulting in a higher payout to the publisher. As an overall effect, Google Ads advertisers win additional inventory than they would without Bernanke, and publishers also see higher payouts." ([REDACTED] (Google) Deposition, at 294:9-24).

<sup>1159</sup> GOOG-DOJ-13392025, at -025; GOOG-DOJ-14161943, at -944-45; GOOG-DOJ-15637938, at -938.

<sup>1160</sup> GOOG-DOJ-13392025, at -025.

<sup>1161</sup> GOOG-DOJ-14161943, at -944.

<sup>1162</sup> See Figure 103.

<sup>1163</sup> Gans Report, at ¶744 ("Google designed Bernanke to help its ad buying tool for small advertisers win more transactions at the expense of rivals on AdX. The conduct relied on anticompetitive means to achieve Google's goal to "win more." Bernanke and its variants relied on Google's monopoly power in the market for ad buying tools for small advertisers.").

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indicate that the share of all AdX open auction impressions won by Google Ads buyers was decreasing during and after the implementation of Bernanke.<sup>1164</sup>

**B. Dynamic Revenue Share Was a Legitimate Business Innovation that Did Not Harm Competition**

618) In my opinion, DRS was a procompetitive feature that enhanced competition on the merits between Google and other exchanges. DRS allowed AdX to compete for marginal impressions by lowering the fees Google charges publishers. The result was increased publisher revenue and quality of matches through growth in the number of publisher impressions that were matched with advertisers. In this section, I explain that Professor Gans confuses the enhanced competition brought about by DRS with anticompetitive foreclosure. I show that Professor Gans' data analysis includes calculation errors that render his conclusions flawed and unreliable. I also show that DRS affected only a small subset of impressions and therefore could not plausibly have foreclosed competition. Finally, I show that in those instances in which DRS did apply, it benefited publishers by increasing their revenue and advertisers by resulting in more high-quality matches.

***1. Background on Dynamic Revenue Share***

619) DRS was a sell-side optimization feature implemented in Google's ad exchange that was designed to increase the frequency that auctions ended with a winning buyer by dynamically changing Google's revenue share on a per query basis.<sup>1165</sup> Prior to the implementation of DRS, Google charged

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<sup>1164</sup> Google Ads buyers won about [REDACTED] of U.S. AdX open auction impressions in Summer 2013 before the initial launch of Bernanke, before steadily declining to the under [REDACTED] of impressions won in Spring 2023, as shown in Figure 173. This is not the product of Google Ads buyers decreasing their ad spend on AdX as both they and buyers using other tools increased their level of ad spend over the same period. Figure 174 shows that in June of 2013 the gross revenue of Google Ads publishers was consistently higher than other publishers, whereas by 2021, the gross revenue levels of the two groups had reached similar levels.

<sup>1165</sup> GOOG-DOJ-15130321, at -321.

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publishers a fixed revenue share for transacting on AdX and, unless otherwise negotiated, that revenue share was [REDACTED].<sup>1166</sup> Bids in AdX competed on a net-bid basis (i.e., Google's revenue share was subtracted from the amount that a bidder offered before the bid was submitted to compete in the auction).<sup>1167</sup> If no net bid was at least as high as the reserve price set by the publisher, the impression would not be matched on AdX and it may or may not have been matched on another ad exchange. A Google analysis indicated that [REDACTED] of publishers' impressions had gone unfilled if they failed to clear on AdX.<sup>1168</sup>

620) DRS was designed to solve the problem of unmatched impressions and took effect when no AdX bids cleared the auction reserve price set by the publisher.<sup>1169</sup> Google identified auctions in which the highest bid was above the AdX reserve price but fell below the reserve price after Google's revenue share was deducted. This region of bid prices was referred to as the "dynamic region."<sup>1170</sup> By allowing Google to adjust the revenue share it took on these transactions, DRS increased the likelihood that a match would be made, which ultimately benefited publishers as well as advertisers. In other words, DRS was a method through which Google was able to compete more aggressively by lowering its fees to clear publishers' inventory.

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<sup>1166</sup> GOOG-DOJ-03619484, at -484.

<sup>1167</sup> GOOG-DOJ-06867901, at -903-04.

<sup>1168</sup> GOOG-DOJ-06134599, at -615 ("Simplicity: one way to target, one way to optimize, one set of reporting entities, etc. Of the [REDACTED] that do not compete, having a single inventory unit will allow us to learn more about the impression and how to get it into auction (e.g. was it a real opportunity and if so, what do we need to do/build to capture it? capturing less than half of each of these segments would help us see growth.) [REDACTED] impressions currently matched per month; grow to [REDACTED] (breakdown of impressions we compete and lose on is [REDACTED] Direct, [REDACTED] Indirect, [REDACTED] House, [REDACTED] Unfilled; if we could get at least [REDACTED] of Indirect, and [REDACTED] each of House and Unfilled, we could grow by [REDACTED])

<sup>1169</sup> GOOG-DOJ-03619484, at -484.

<sup>1170</sup> GOOG-DOJ-13199952, at -954.

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621) Documents describe three versions of DRS. The first version (DRS v1) was introduced in August 2015 and only lowered revenue shares.<sup>1171</sup> The second version (DRS v2) was introduced in December 2016 and it allowed AdX to recoup the lower fees charged on some auctions by raising fees on others, while maintaining an average revenue share consistent with their contracts.<sup>1172</sup> Both DRS v1 and DRS v2 did not use any data about the advertiser, publisher, or user beyond basic details describing the auction including the bid prices, revenue shares, and the reserve price. Finally, in July 2018, Google launched Truthful DRS (“tDRS”), which, as will be detailed later, could have been implemented by any ad exchange.<sup>1173</sup>

622) DRS was discontinued when Google shifted AdX to the Unified First Price Auction (UFPA) in September 2019.<sup>1174</sup> Under tDRS, for each impression, AdX’s revenue share would be determined based on the predictions for AdX buyers’ bids.<sup>1175</sup>

**2. Professor Gans’ Analyses of DRS Do Not Support His Conclusion that DRS Harmed Ad Exchange Competition, Publishers, or Advertisers**

623) Professor Gans’ data analyses of DRS contain several material errors that result in him drawing incorrect conclusions. First, he does not implement the data corrections specified in Google’s

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<sup>1171</sup> GOOG-DOJ-15068390, at -390.

<sup>1172</sup> Declaration of Nitish Korula (August 4, 2023), GOOG-AT-MDL-008842393, at ¶33; GOOG-DOJ-14718514, at -514.

<sup>1173</sup> GOOG-DOJ-13949282, at tab “Q3Q4 2018,” row 7.

<sup>1174</sup> Declaration of Nitish Korula (August 4, 2023), GOOG-AT-MDL-008842393, at ¶36; GOOG-DOJ-15130321, at -321.

<sup>1175</sup> GOOG-DOJ-13227256, at -260 (“[I]f the prediction is below the threshold set by us, we will make the publisher reserve revshare [redacted] (i.e. decrease adx revshare to [redacted] otherwise, we will keep the original publisher reserve revshare of [redacted]. When AdX’s choice was to apply [redacted] revenue share to the impression and the impression sold, tDRS would add “debt” to the publisher’s balance equal to the revenue that Google lost due to choosing a [redacted] revenue share. See GOOG-DOJ-13227256, at -261 (“When the final publisher sellside revshare is higher than the base\_revshare [redacted] then we add the amount difference between base revshare and final sellside revshare onto this publisher’s account as debt.”).

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letters (the “Gmob correction”) so his results are incorrect.<sup>1176</sup> Second, he does not examine the impact of DRS based on the way it actually functioned. Professor Rinard’s review of the DRS source code indicates that, to generate an AdX revenue share of [REDACTED] for each publisher, Google’s algorithm based the calculation on all impressions received by a publisher without regard to whether the users were in the U.S. or abroad and did not place limitations on transaction types.<sup>1177</sup> Professor Gans’ data analysis assumes that averaging occurred over U.S. users for open auction impressions in isolation.<sup>1178</sup> Professor Gans’ results are biased because he incorrectly applies these two restrictions (averaging over U.S. users and limiting to open auction transactions) and does not apply the Gmob correction.

624) When one corrects these three errors, the patterns that Professor Gans claims support his conclusions that DRS is anticompetitive are no longer present in his figures. The effect of these corrections on Professor Gans’ Figure 35 is especially pronounced. Exhibit 33 applies all three data corrections to Professor Gans’ Figure 35 and shows that the difference he describes between his narrow group of display ads and his mobile in-app group effectively vanishes. As a result, Professor Gans’ conclusion that “Google used its market power to recoup losses from DRS by increasing the take rate for mobile app requests [and] Google’s more aggressive take rates on mobile app requests resulted in

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<sup>1176</sup> See GOOG-AT-MDL-008932468, at -471.

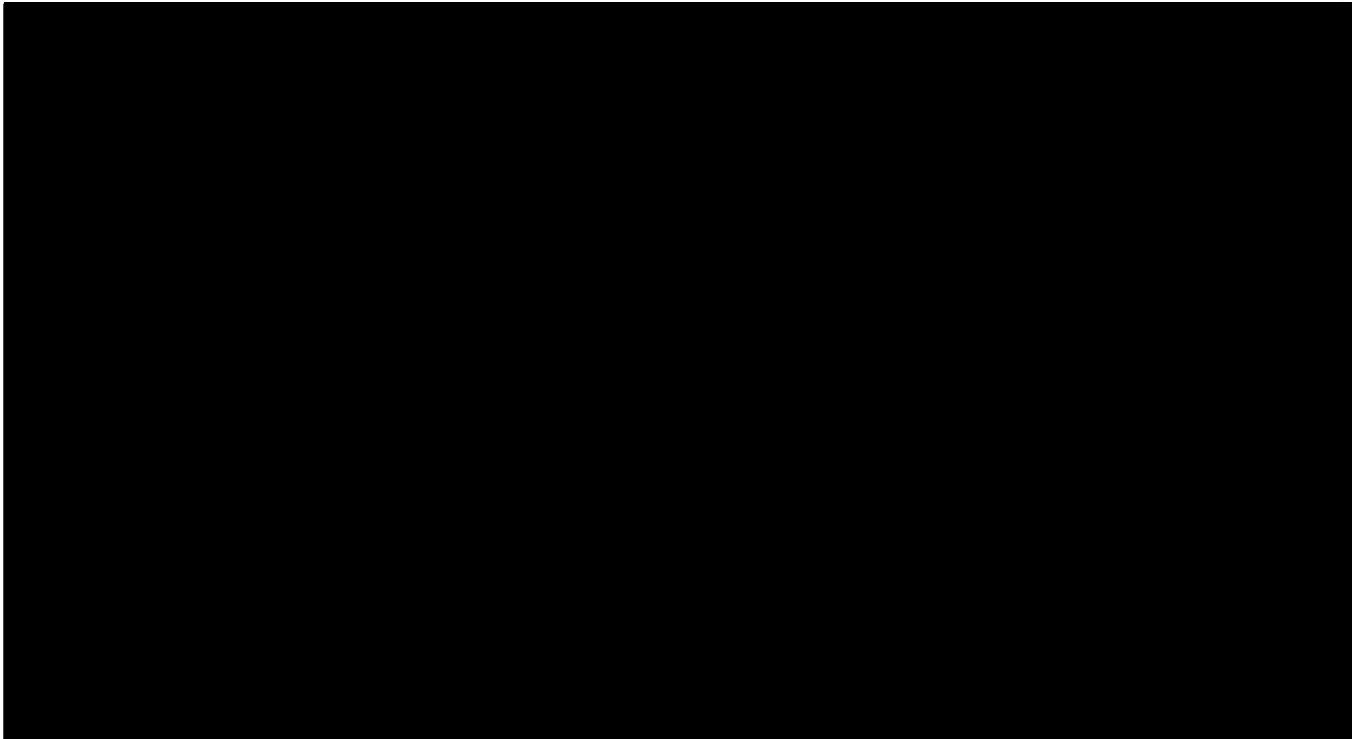
<sup>1177</sup> See Rinard Report, at ¶105, fn. 63 (“My source code analysis confirms that the pipeline iterates over the publisher’s prior queries, excluding those that are “dummy” queries, are missing relevant information, or are not AdX “content ads queries.” (The DRS v.2 version of this code does not materially differ.) For the avoidance of doubt, I see no indication in the source code that there is any limitation or exclusion by geographical region or transaction type. See Technical Appendix at ¶ 37 for which types of queries are ignored in the calculation.”).

<sup>1178</sup> Gans Report, at ¶821, fn. 1051.

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publishers being charged more than [REDACTED] across mobile and non-mobile requests”<sup>1179</sup> are the result of errors in his calculations.

**Gans Report Figure 35**



Source: Gans Report.

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<sup>1179</sup> Gans Report, at ¶823.

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**Exhibit 33**  
**Data Corrections Applied to Gans' Take Rate Analysis of Figure 35**

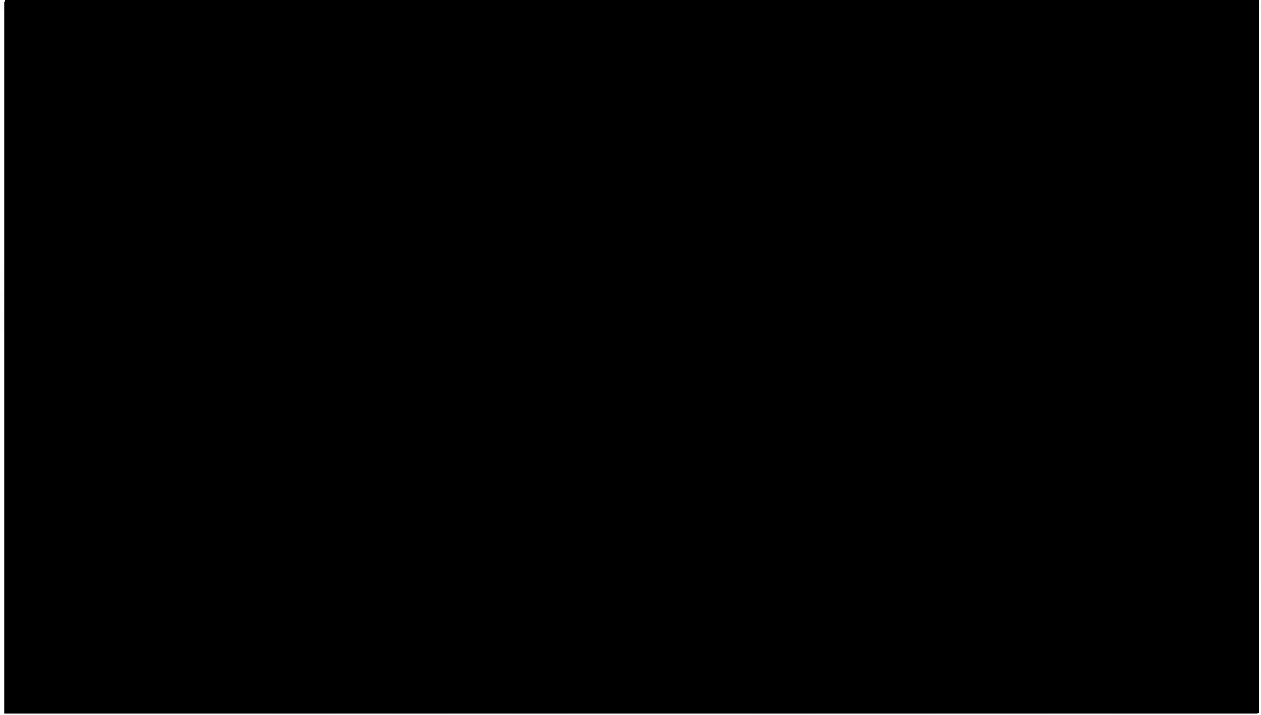


Source: Gans Report, at Figure 35.

625) Other calculations from Professor Gans also change in important ways when applying these three data corrections. Based on the result in his Figure 34, Professor Gans' claims that the AdX revenue shares increased above [REDACTED] after the launch of DRS v2. But these results also disappear with these data corrections (*see* Exhibit 34). When the three data corrections are applied, the data show that there was no increase above [REDACTED] to the AdX revenues shares following the launch of DRS v2.

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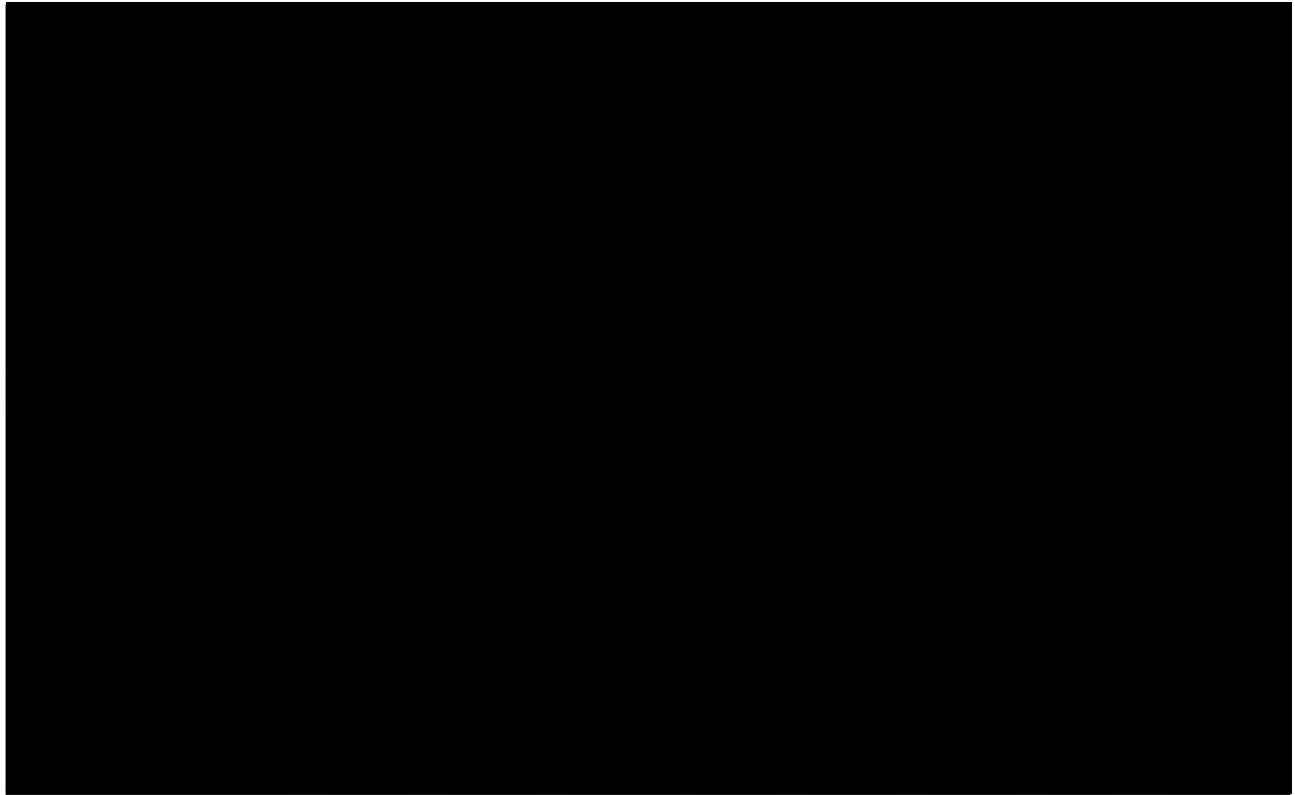
**Gans Report Figure 34**



Source: Gans Report.



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Source: Gans Report, at Figure 34.

626) More broadly, Professor Gans' conclusions heavily rely upon certain outliers that have no discernible relevance to the way that DRS actually operated.<sup>1180</sup> Professor Gans asserts that, as shown in his Figure 37, "after the launch of DRS v1, the take rates across web properties became highly variable [and] [s]ome web properties incurred a substantial average monthly rate increase of much more than [REDACTED]"<sup>1181</sup> After applying the three data corrections to Professor Gans' Figure 37, some publishers appear

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<sup>1180</sup> I also note that many of Professor Gans' conclusions are predicated upon his observation of constant revenue shares prior to DRS. For example, he asserts that "Before DRS, no publisher was charged above [REDACTED] and the take rates were equivalent for mobile and non-mobile requests." (Gans Report, at ¶824). The letter in which Google describes the Gmob correction indicates that "Before 7/8/2014 Google does not have readily available data for the gross revenue (it was not recorded in the data tables at the time). We instead provide an estimate of the gross revenue based on the publisher-net-revenue multiplied by a constant factor of [REDACTED] corresponding to the global average for the remaining days of July 2014." (GOOG-AT-MDL-008932468, at -471). Thus, the lack of variability in revenue shares to which he points arises from a data production process.

<sup>1181</sup> Gans Report, at ¶842.

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in Professor Gans' calculations with negative revenue shares.<sup>1182</sup> Professor Gans' discussion of the underlying functioning of DRS provides no explanation for the AdX revenue share to exceed [REDACTED] during DRS v1 or for Google to pay publishers more than Google actually receives from advertisers. As a result, it is more plausible that the revenue shares that are below [REDACTED] and above [REDACTED] during DRS v1 are attributable to other factors that might affect account balances from month to month. He does not consider a variety of other potential factors that might lead to outcomes that defy the logic of DRS.<sup>1183</sup>

627) Moreover, the vast majority of these outliers disappear entirely when the logic Professor Gans applies in his Figure 36 to identify outliers is applied to his Figure 37. Closer inspection of the data reveals that thousands of records he includes in his analysis include publishers that earned less than \$1 in ad revenue, and some served only one impression.<sup>1184</sup> Professor Gans indicates, in the methodology that accompanies his figures, that his analyses exclude test accounts and, in some analyses, he excludes accounts that earn less than \$1,000 per month.<sup>1185</sup> Thus, it appears that he agrees that it is not appropriate to provide these records with the same weight as other publishers when examining revenue shares. The AdX revenue associated with these outliers has de minimis impact on Google's revenue but small fluctuations in the payments they receive (which amount to pennies in many instances) can appear as

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<sup>1182</sup> See Exhibit 35.

<sup>1183</sup> As one example, Google Ad Manager support pages describe scenarios in which publishers might observe deductions from earnings, such as instances of "invalid clicks" or policy violations. (Google Ad Manager Help, "Deductions from earnings FAQs," available at: <https://support.google.com/admanager/answer/6389769>. Accessed June 29, 2024).

<sup>1184</sup> See Exhibit 36.

<sup>1185</sup> Gans Report, at fn. 1057 ("'web\_property\_name' that contains 'Test,' 'test,' 'demo,' or 'Demo' is excluded because it can be just a test account and the take rate is skewed... Take rates are calculated with formula 'adx\_net\_rev\_usd' divided by 'gross\_rev\_usd' times 100 but are not calculated when 'Gross\_rev\_usd' is less than \$1,000 to avoid outlier take rates close to 100%.").

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large swings in revenue shares. Therefore, I adopt these corrections and apply the outlier correction from Professor Gans' Figure 36 to the corrected version of his Figure 37.<sup>1186</sup>

628) Finally, as virtually all of the outliers disappear with this one correction, I magnify the scale of his calculations, as Professor Gans does in several figures, and scale the size of the data points to correspond to the number (or density) of publishers to which the revenue shares apply.<sup>1187</sup> Contrary to Professor Gans' claims about DRS, these calculations demonstrate that the overwhelming majority of publishers were, in fact, receiving AdX revenue shares at small discounts relative to the typical 20-percent revenue share. These results are inconsistent with Professor Gans' claim that DRS harmed publishers.<sup>1188</sup>

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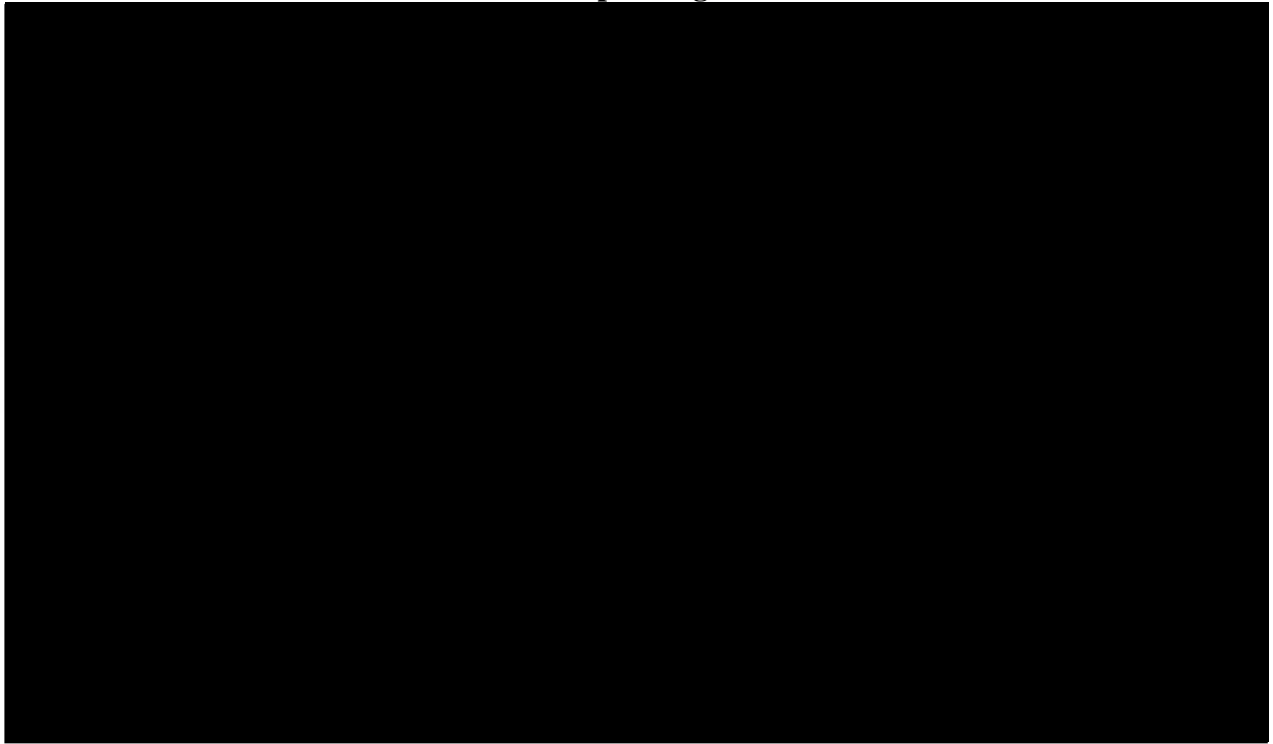
<sup>1186</sup> Gans Report, at fn. 1057 ("Take rates are calculated with formula 'adx\_net\_rev\_usd' divided by 'gross\_rev\_usd' times 100 but are not calculated when 'Gross\_rev\_usd' is less than \$1,000 to avoid outlier take rates close to 100%.").

<sup>1187</sup> See Exhibit 37. I discretize publishers' revenue shares in each month into groups comprising tenth-of-a-percentage-point increments and then plot the size of each "bubble" on the figure to be scaled to the number publishers in each of these groups. I also apply Professor Gans' outlier correction methodology from his Figure 36.

<sup>1188</sup> Figure 175 through Figure 181 also present Professor Gans' Figures 33, 36, and 38 after applying the three data corrections. These figures also demonstrate that Professor Gans' conclusions, such as his assertion that "Google tended to subsidize larger publishers" are based upon an incorrect calculation of his data points and the patterns to which he points for his conclusions have little to do with the actual functioning of DRS. (Gans Report, at ¶844).

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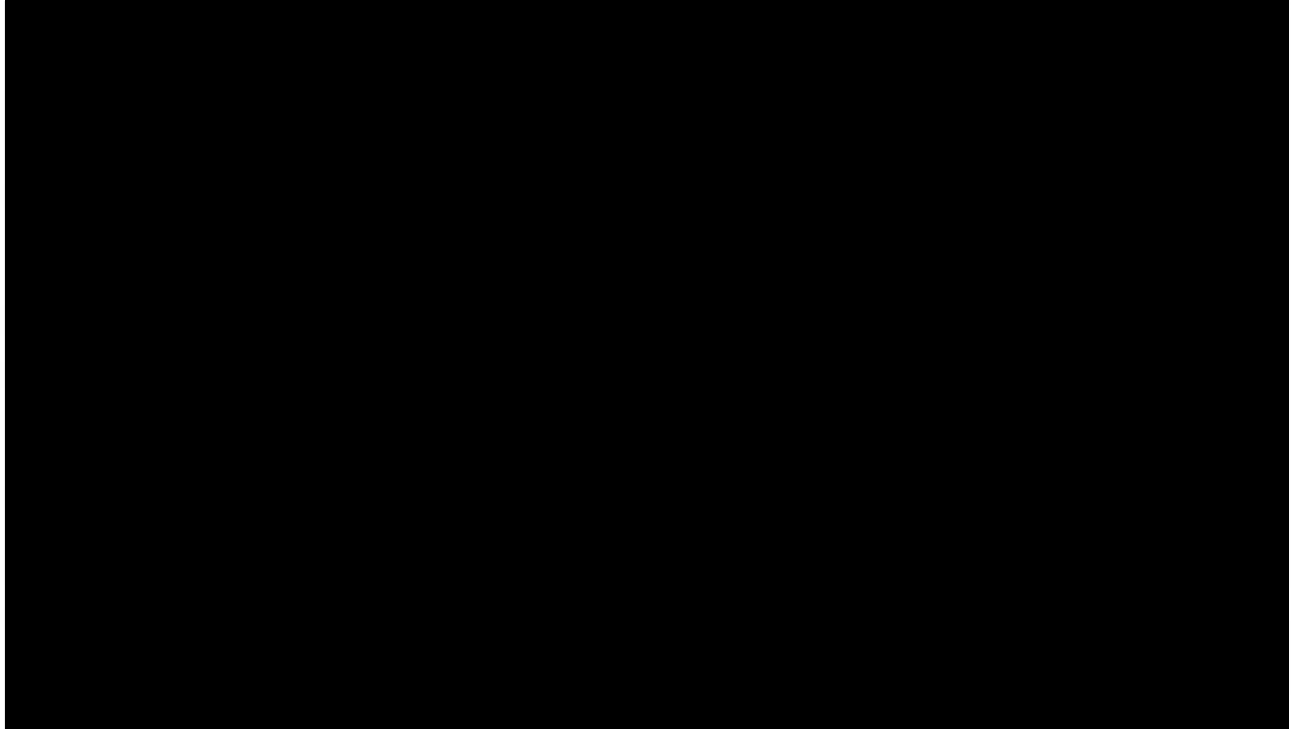
**Gans Report Figure 37**



Source: Gans Report.

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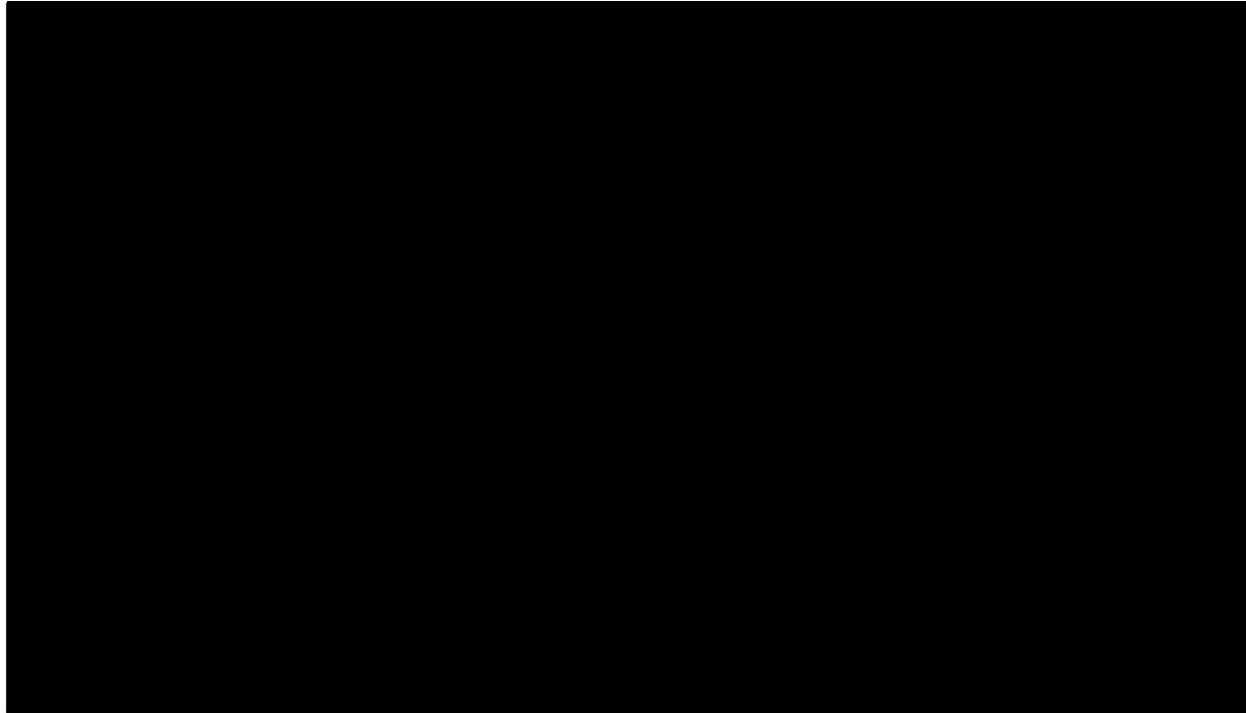
**Exhibit 35**  
**Data Corrections Applied to Gans' Take Rate Analysis of Figure 37**



Source: Gans Report, at Figure 37.

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**Exhibit 36**  
**Data Corrections and Gans Outlier Correction Applied to Gans' Take Rate Analysis of Figure  
37**

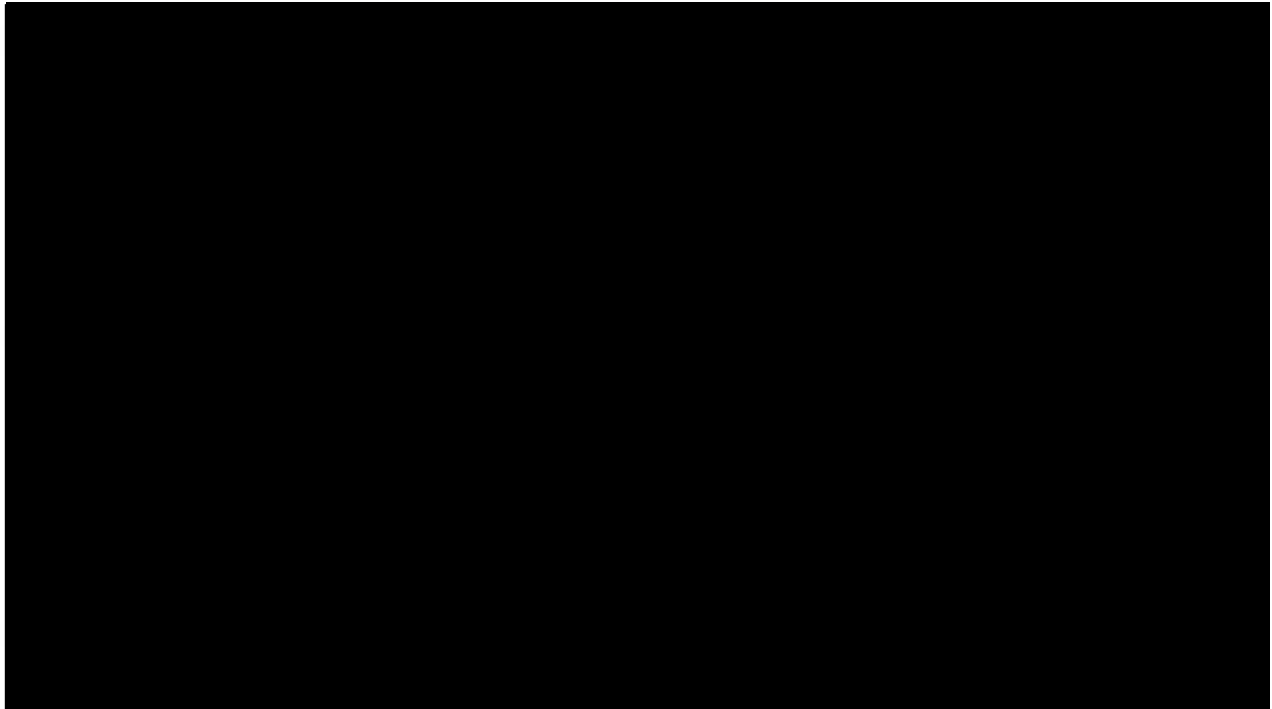


Source: Gans Report, at Figure 37.

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**Exhibit 37**

**Data Corrections and Gans Outlier Correction Applied to Gans' Take Rate Analysis of Figure 37 with Data Points Scaled to Reflect Number of Publishers**



Source: Gans Report, at Figure 37.

629) To summarize, Professor Gans' data analyses do not support his conclusions that DRS "seem[s] to share some characteristics with predatory pricing"<sup>1189</sup> nor does it support his conclusion that Google used DRS to charge an average revenue share above [REDACTED]

630) Professor Gans also fails to demonstrate any relevant instance in which an exchange exited as a result of DRS. Indeed, Professor Gans notes that "Google has been charging approximately a [REDACTED] take rate on open auctions since 2013."<sup>1190</sup> Professor Gans' insinuation is also inconsistent with

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<sup>1189</sup> Gans Report, at ¶713.

<sup>1190</sup> Gans Report, at ¶811.

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documents in the record that Google “throttled”<sup>1191</sup> DRS on certain auctions in order to keep the AdX revenue share at [REDACTED] or higher on average.<sup>1192</sup> Documents describe this throttling mechanism as a protective measure to “prevent buyer and seller abuse” and “prevent [DRS] from eroding AdX margins too much.”<sup>1193</sup> Whereas predatory pricing pursues lower prices to harm competition, these mechanisms sought to avoid the potential for opportunistic behavior by customers.

631) As I discuss in more detail below, DRS is best viewed as innovation through which Google programmatically cut the AdX take rate to permit publishers to sell inventory that would otherwise go unsold. Professor Gans appears to agree: “As the take rate in DRS v1 (i.e., the first version of DRS) was always equal to or lower than the existing take rate, it was effectively a price cut and as such could have increased transactions without immediate harm to competition.”<sup>1194</sup> Instead of concluding that DRS was procompetitive, Professor Gans speculates that “Google never intended for this to be the case. Google planned the second version of DRS (DRS v2) – that did not just lower AdX’s take rate selectively... [T]he discounted take rates were funded by an increase in the take rate on other auctions with the same publisher. This was achieved by accounting for discounts as a ‘debt’ that would need to be recouped

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<sup>1191</sup> Google was concerned that buyers would “shade” (that is, bid below what they believe the impression to be worth) their bids after observing that auctions still cleared when their net bids were below the reserve price. Google was also concerned that publishers might raise price floors in response to DRS. To mitigate these concerns and maintain a target average revenue share, Google would probabilistically disable DRS on certain DRS-eligible transactions via a mechanism called “throttling” (see GOOG-DOJ-06867901, at -908-910; GOOG-DOJ-14368357, at -357; GOOG-DOJ-03619484, at -484).

<sup>1192</sup> GOOG-DOJ-03619484 at -484; GOOG-DOJ-15068390 at -390 (Google kept its fee at [REDACTED] or higher on average under DRS V1. Under DRS V2, Google maintained an average fee at the originally contracted [REDACTED] level.).

<sup>1193</sup> GOOG-DOJ-14368357 at -357; GOOG-DOJ-06867901, at -908.

<sup>1194</sup> Gans Report, at ¶778.



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from raising take rates on other transactions over a specified time period.”<sup>1195</sup> There is no economic basis for assuming that this is anticompetitive.

632) Professor Gans appears to acknowledge this, but speculates that publishers were worse off because the lack of transparency “subverted the competitive process.”<sup>1196</sup> Even if Professor Gans is correct that publishers were unaware of the exact margin on each and every one of the millions of impressions a publisher might receive in a given month, they can readily evaluate the yields they receive and compare those with experiences on other exchanges, networks, and against direct deals. And, if Google had offered publishers an opportunity to observe and approve each take rate associated with each impression impacted by DRS,<sup>1197</sup> Professor Gans offers no evidence that publishers would have preferred this but-for alternative to DRS. He also provides no evidence that a representative publisher in his candidate markets preferred the status quo to DRS. Regardless, the documents and data are inconsistent with Professor Gans’ assertion that DRS harmed publishers or competition.

633) Professor Gans also asserts that: “If [Google] did not have monopoly power on the sell-side, and was not vertically integrated into the exchange market, where DRS took place, Google... would not have had the incentive to balance things out on a per-publisher basis, as AdX did in DRS v2. Similarly, the publisher ad server would not have had an incentive to obscure the actual take rates and subvert competition between exchanges.”<sup>1198</sup> Even if Professor Gans is correct that integration was a lynchpin

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<sup>1195</sup> Gans Report, at ¶779.

<sup>1196</sup> Gans Report, at ¶780.

<sup>1197</sup> It should be understood that Google offering a publisher a lower AdX revenue share on a current impression (for which there is no winning bid above the publisher’s floor) would be conditioned upon the publisher accepting a higher AdX revenue share on another impression (where the winning bid is above the publisher’s floor), so as to maintain a [REDACTED] revenue share.

<sup>1198</sup> Gans Report, at ¶781.

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for DRS, this does not demonstrate that DRS harmed competition. Regardless, and contrary to Professor Gans' assertion that both monopoly power and integration were necessary conditions for Google's ability to "subvert competition" between exchanges, Google is not alone in implementing mechanisms similar to DRS. For example, information in the record indicates that OpenX and Xandr implemented programs similar to DRS.<sup>1199</sup> Thus, Professor Gans' conclusion can be correct only if Google's rivals within the same candidate markets that he defines are also monopolists.<sup>1200</sup>

634) Professor Gans further asserts that: "AdX has the ability to price-discriminate across impressions" and that the "ability to charge a supracompetitive take rate for a segment of the market is direct evidence of monopoly power in those market segments."<sup>1201</sup> First, Professor Gans has not demonstrated that AdX price discriminates. Even in perfectly competitive markets, prices paid by individual customers may vary over time due to fluctuations in demand or supply. In this case, the demand and supply for impressions from a particular publisher can and do vary across publishers, advertisers, and across time. Second, contrary to what Professor Gans implies, DRS does not discriminate on the basis of "the level of competition faced" by *Google*. Rather, DRS adjusts the AdX revenue share based on how aggressively *advertisers* bid for publishers' impressions—not on the

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<sup>1200</sup> I note that both OpenX and Xandr operated integrated publisher ad servers and ad exchanges, and Xandr is also integrated into buying tools. (Internet Archive, "Unified Monetization Platform Our Full Product Suite," available at: <https://web.archive.org/web/20140122052900/http://openx.com/publishers/>. Accessed June 29, 2024; AppNexus "AppNexus Launches Full-Stack Publisher Suite," available at: <https://www.prnewswire.com/news-releases/appnexus-launches-full-stack-publisher-suite-300172012.html>. Accessed June 29, 2024).

<sup>1201</sup> Gans Report, at ¶813.

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intensity of competition among *exchanges*.<sup>1202</sup> Third, Professor Gans has neither identified nor defined any “segment of the market” in which Google can charge “supracompetitive take rates.” DRS v1 and DRS v2 do not target a particular segment of the publisher population.<sup>1203</sup> Variability in AdX revenue shares arises because random differences in bid prices and publisher price floors require different AdX revenue shares to sell publisher inventory that would otherwise go unsold. In short, the presence of variation in AdX revenue shares (or variation in winning bids, CPM, or CPC) is insufficient to establish price discrimination.<sup>1204</sup> Finally, as I noted in my discussion of monopoly power, as a matter of economics, it is incorrect for Professor Gans to conclude that AdX has monopoly power merely because a business document indicates that “AdX had a [REDACTED] market share.”<sup>1205</sup> Monopoly power requires the ability to sustain prices substantially above the competitive level. Even by Professor Gans’ own description of DRS v2, any price increases observed were transitory and (as shown in Panel B of his Figure 33) quite modest rather than substantial.<sup>1206</sup>

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<sup>1202</sup> DRS can adjust the revenue share on an impression where there is only one bid just as if the impression had many bids. If bids are low because not many advertisers want to buy an impression, Google lowers its revenue share to allow the publisher to make money it would otherwise lose and (in DRS v2) subsequently increases its revenue on inventory where competition among advertisers for that publisher’s impression is more intense—driving up CPM bids.

<sup>1203</sup> DRS v2 uses higher revenue shares to make everyone whole after having previously cut prices, and does not target a particular segment of the publisher population.

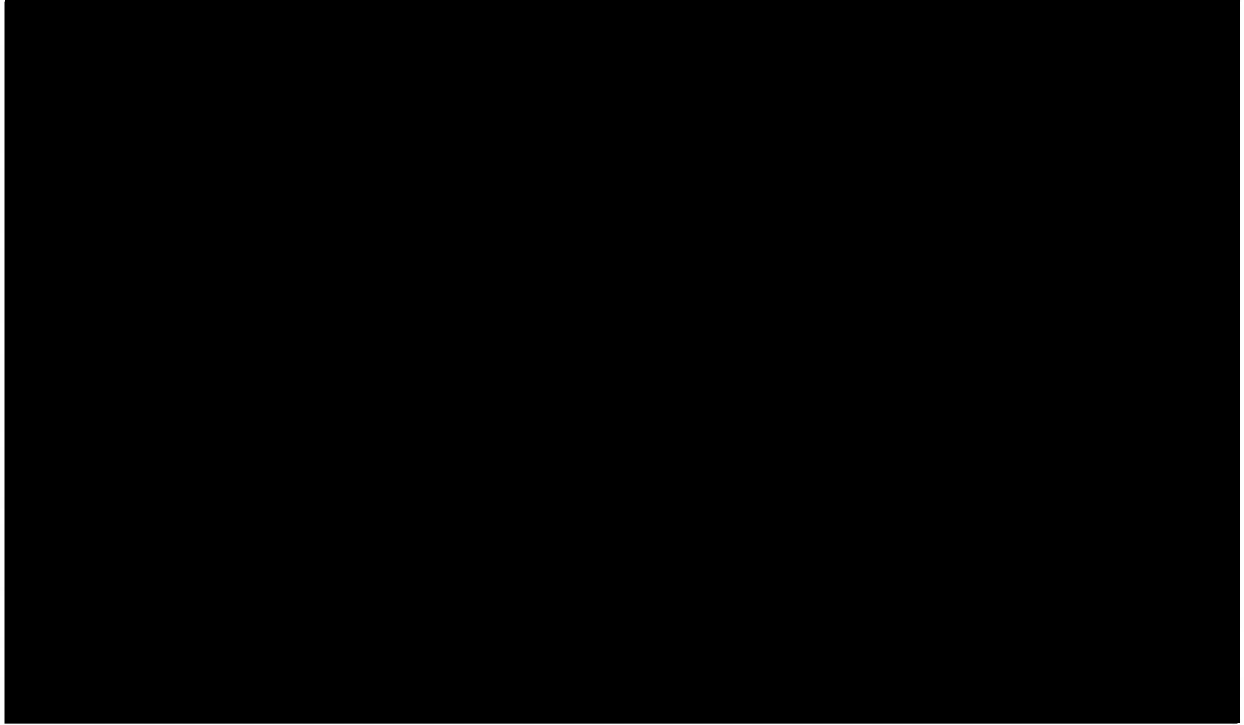
<sup>1204</sup> Additionally, there may be idiosyncratic costs associated with serving specific customers. Price variations due to cost differences are not discriminatory prices.

<sup>1205</sup> Gans Report, at ¶813.

<sup>1206</sup> Had Professor Gans not magnified the scale of the effect he purports to identify in Panel A, the effect is hardly visible to the naked eye. His Figure 33 indicates only three months in which the AdX revenue share is above [REDACTED] percent and it never exceeds [REDACTED] percent.

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**Gans Report Figure 33 Panel B**



Source: Gans Report.

635) Professor Gans makes a number of other assertions that he does not support. For example, he asserts that “DRS did not function as advertised. In DRS v1, the winner is charged [REDACTED] times the reserve price, not the second highest bid. In DRS v1 and DRS v2, Google peeked at buyers’ bids before changing its take rate and charged the advertisers higher than the second-highest bid.”<sup>1207</sup> Without support, it is unclear how Professor Gans arrived at his conclusion.

**3. *DRS Impacted a Limited Number of Impressions***

636) Professor Gans’ conclusion that DRS harmed competition in his candidate ad exchange market ignores the fact that DRS only applied to a small subset of auctions. While it is true that DRS

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<sup>1207</sup> Gans Report, at ¶851.

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was beneficial to publishers, advertisers, and Google (as discussed below), the additional volume of impressions that AdX was able to win as a result of more efficient price competition was likely too small to foreclose competition in Professor Gans' candidate ad exchange market even if one ignores that it was procompetitive. Combined with the fact that DRS allowed publishers to sell impressions that would otherwise go unsold, it is highly unlikely that DRS harmed rivals' ability to compete with AdX.

637) DRS v1 was in effect from August 2015 to December 2016, and it applied only to Open Auction impressions won by DV360 and non-Google buying tools—not to impressions won by Google Ads.<sup>1208</sup> Google data indicate that DV360 and non-Google buying tools won █████ percent of all U.S. AdX impressions from August 2015 to December 2016,<sup>1209</sup> so DRS v1 could have applied to no more than that fraction of U.S. AdX impressions. Because Professor Gans has not established that Google has monopoly power or market power in his “complementary” buying tools market for large advertisers, this could not have harmed competition in any event.

638) DRS v2 was even more limited in scope. DRS v2 was in place from December 2016 to July 2018 and could only apply to AdX Open Auction transactions won by non-Google buying tools and therefore was inapplicable for transactions where the buyer was using DV360 or Google Ads.<sup>1210</sup> Furthermore, DRS was only applied when the AdX bid was within the “dynamic range” where the highest “net” bid was beneath the publisher's price floor but the “gross” bid above the floor. Thus,

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<sup>1208</sup> GOOG-DOJ-15130321, at -322, -327; GOOG-DOJ-13208074, at -074; GOOG-DOJ-14368357, at -357.

<sup>1209</sup> This percentage is calculated using Sellside Daily X-Data. AdX transactions are identified using the pub\_product field, buy-side platforms are identified using the adX\_ad\_source\_type\_name field, and Open Auction transactions are identified using the transaction\_type field. See Sellside Daily X-Data.

<sup>1210</sup> GOOG-DOJ-13208074, at -074; GOOG-DOJ-13207875, at -875; GOOG-DOJ-13949282, at tab “Q3Q4 2018,” row 7.

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auctions in which at least one “net” bid was above the publisher’s price floor were unaffected by DRS.<sup>1211</sup>

639) Documents are consistent with these observations that DRS applied to a narrow set of auction outcomes. One document states that prior to the launch of DRS v2, “[i]f [DRS] were launched fully to all publishers, about [REDACTED] of AdX of impressions [would] happen due to DRS.”<sup>1212</sup>

**4. DRS Was a Procompetitive, Quality-Enhancing Feature**

640) DRS was a procompetitive innovation that increased publisher revenue and ecosystem welfare by expanding the number of impressions matched with a buyer. But for DRS, publishers likely would not have filled as much of their ad space. DRS creates value for publishers and advertisers by enabling transactions that both advertisers and publishers value that may otherwise go unfilled or be filled with house ads. Google documents make this clear, stating that “[t]he reason everyone can be a net beneficiary is because DRS is efficiency-enhancing; it ‘grows the pie’.”<sup>1213</sup> Indeed, as shown in the data, impressions from House Ads continue to decline since DRS v1 was launched, with publishers filling more of their inventory with line items they can monetize.<sup>1214</sup> Professor Milgrom similarly has concluded that DRS resulted in auction efficiencies.<sup>1215</sup>

641) Documents are also consistent with advertisers and third-party buying tools benefiting from DRS as it increased their match rates and revenue. For example, documents indicate that the launch of

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<sup>1211</sup> GOOG-DOJ-13199952, at -954.

<sup>1212</sup> GOOG-DOJ-15195905, at -911.

<sup>1213</sup> GOOG-DOJ-13504758, at -760.

<sup>1214</sup> See Figure 182.

<sup>1215</sup> Milgrom Report, at ¶157.

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DRS v1 resulted in a match rate increase of [REDACTED] for AdX publishers selling to third-party DSPs (AdX Buyers).<sup>1216</sup> This increase in newly matched queries corresponded with a [REDACTED] increase in spending from advertisers using third-party DSPs.<sup>1217</sup> Subsequently, an experiment examining the effect of DRS opt-out found that the removal of DRS would lead to decreases in matched queries and revenue for third-party DSPs of [REDACTED] and [REDACTED] percent, respectively.<sup>1218</sup> A higher match rate is in the best interest of a third-party DSP as it means more advertiser budget is successfully spent, which results in more total revenue for the DSP from fees charged to advertisers.

642) Documents also indicate that the ability to implement programs like DRS was not unique to Google. Nationwide, for example, had “negotiated with [third-party] exchanges that the [third-party exchange] will take a lower take rate from Nationwide and pass the savings back to the buyer.”<sup>1219</sup> In 2017, the Guardian accused Rubicon Project of charging undisclosed buyer fees.<sup>1220</sup> Rubicon Project’s (now Magnite) 10-K filings indicate that it “typically charged buyers a variable price for real-time bidding impressions without specifying the amount or method of determination of the fee that is included in the price.”<sup>1221</sup> Another ad exchange, PubMatic, explained to Ad Exchanger that “it calculates the fees on an impression-by-impression basis” and that this calculation takes into consideration the bid-stream

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<sup>1216</sup> GOOG-DOJ-14368357, at -357.

<sup>1217</sup> GOOG-DOJ-14368357 at -358.

<sup>1218</sup> GOOG-DOJ-AT-02427522, at -522.

<sup>1219</sup> GOOG-DOJ-13504758, at -758.

<sup>1220</sup> Sarah Sluis, “Explainer: More On The Widespread Fee Practice Behind The Guardian’s Lawsuit Vs. Rubicon Project,” Ad Exchanger, March 30, 2017, available at: <https://www.adexchanger.com/ad-exchange-news/explainer-widespread-fee-practice-behind-guardians-lawsuit-vs-rubicon-project/>.

<sup>1221</sup> Rubicon Project March 2017 10-K, at 22.

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density (a.k.a. number of buyers) and “the difference between an advertiser’s bid and the clearing price.”<sup>1222</sup>

643) Contrary to Professor Gans’ assertion that Google tried to conceal DRS,<sup>1223</sup> documents indicate that Google provided publishers with the opt-out option for DRS beginning in June 2016 through a public announcement and a pop-up that appeared in the AdX UI.<sup>1224</sup> By February 2017, just 269 publishers (representing no more than 16 percent of all U.S.-based AdX publishers at the time) had opted out.<sup>1225</sup> DRS was designed to enable more auctions to end with a winning buyer,<sup>1226</sup> thereby getting more transactions cleared and allowing publishers to capture additional revenue.<sup>1227</sup>

644) Professor Gans also claims that Google revealed DRS to publishers in summer 2016 and falsely told them that it would “increase a publisher’s yield”<sup>1228</sup> when Google internally acknowledged

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<sup>1222</sup> Sarah Sluis, “Explainer: More On The Widespread Fee Practice Behind The Guardian’s Lawsuit Vs. Rubicon Project,” Ad Exchanger, March 30, 2017, available at: <https://www.adexchanger.com/ad-exchange-news/explainer-widespread-fee-practice-behind-guardians-lawsuit-vs-rubicon-project/>. Accessed June 29, 2024.

<sup>1223</sup> Fourth Amended Complaint, at ¶326. *See* Gans Report, at ¶779 (“Google chose not to make publishers aware of the take rates for each transaction. This was an intentional choice by Google. Instead, in later implementations, publishers were given an opportunity to opt out of DRS but without proper information to make that choice.”).

<sup>1224</sup> Google Ad Manager Help, “2016 releases archive, June 13 Change history update, SafeFrame for creative types, Deal check bid filter, Apply per-query revenue share optimization,” available at: <https://support.google.com/admanager/answer/7421657?sjid=10086602547051235141-NA#zippy=%2Cjune-change-history-update-safe-frame-for-creative-types-deal-check-bid-filter-apply-per-query-revenue-share-optimization>. Accessed May 10, 2023. The pop-up was displayed for over two months, until August 1st. Internally, Google referred to this as a “butter bar.” (GOOG-DOJ-15195905, at -907).

<sup>1225</sup> The number of AdX publishers was determined using the gfp\_network\_id field in Diversity data. There are 1,654 unique network IDs that appear in February 2017. This means the share of AdX publishers that opted out was [REDACTED]. Note that AdX-Direct publishers are given a catch-all network ID of zero, which means the true number of U.S. publishers using AdX is likely greater. Thus, [REDACTED] represents the maximum share of AdX publishers that opted-out of DRS by February 2017 (see Diversity Data).

<sup>1226</sup> GOOG-DOJ-15130321, at -321.

<sup>1227</sup> GOOG-DOJ-14718514, at -514.

<sup>1228</sup> Fourth Amended Complaint, at ¶327. *See* Gans Report, at ¶837 (“When Google launched DRS v2, it publicly represented that its revenue share optimizations increased publishers’ yield.”).



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that DRS “did not increase publisher yield.”<sup>1229</sup> Documents in the record are inconsistent with this assertion, as DRS was launched with the “goal to increase publisher and Google revenue.”<sup>1230</sup> An internal study carried out one week after the implementation of DRS v1 indicates that it led to revenue increases for both Google and publishers, with the payout increase for publishers estimated to be [REDACTED] or roughly [REDACTED].<sup>1231</sup> A prospective study on the likely effects of DRS v2 found that it would have a positive effect on Google revenue and neutral effect on publisher revenue relative to DRS v1.<sup>1232</sup> However, when comparing DRS v2 against a but-for world without DRS, documents indicate that the impact of DRS v2 on publisher revenue was positive.<sup>1233</sup> These studies are also consistent with the informal observations of Google’s employees found in documents: “DRS consistently makes publishers more money.”<sup>1234</sup>

**XIII. PROFESSOR GANS DOES NOT DEMONSTRATE THAT PROJECT POIROT, THE FACEBOOK AGREEMENT, RESERVE PRICE OPTIMIZATION, OR ANY OTHER GOOGLE CONDUCT HARMED COMPETITION**

645) Plaintiffs assert that additional conduct—including Project Poirot, Google’s network bidding agreement with Facebook, and reserve price optimization—was anticompetitive. However, none of Plaintiffs’ experts conclude that this conduct harmed competition. I find that Project Poirot, Google’s

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<sup>1229</sup> Fourth Amended Complaint, at ¶329. *See* Gans Report, at ¶836 (“Google represented that DRS increased publishers’ yield, but some publishers are worse off because of DRS, especially those smaller publishers.”).

<sup>1230</sup> GOOG-DOJ-14878128, at -128.

<sup>1231</sup> GOOG-DOJ-14368357, at -358.

<sup>1232</sup> GOOG-DOJ-13207875, at -875.

<sup>1233</sup> GOOG-DOJ-13235100, at -101.

<sup>1234</sup> GOOG-DOJ-13235100, at -101.

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agreement with Facebook, and reserve price optimization were all business decisions that did not harm competition. Nor did Google's conduct otherwise harm innovation.

**A. Project Poirot & Google's Network Bidding Agreement with Facebook Did Not Harm Competition**

646) Although data were available to Professor Gans to evaluate the impact of the conduct in question on header bidding, including header bidding volumes transacted by rival ad exchanges and other data from rival ad exchanges, Professor Gans merely relies on his interpretation of documents to support his opinions that Google's actions were "aimed at limiting the impact of Header Bidding",<sup>1235</sup> and has neither demonstrated that such conduct was anticompetitive, nor that they hit any target. More broadly, neither Professor Gans, nor any other of Plaintiffs' experts, demonstrate that Project Poirot or Google's network bidding agreement harmed competition.<sup>1236</sup> As I have shown above, data in the record indicate that header bidding has thrived and continues to grow. And evidence in the record demonstrates that Google developed innovations such as Open Bidding to compete with header bidding and new features to mitigate harmful externalities such as "dirty" auctions.

647) In July 2017, Google launched Project Poirot, a buy-side innovation that sought to identify exchanges that were not running true second-price auctions and help DV360 bidders by "shading" bids

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<sup>1235</sup> Gans Report, at ¶863.

<sup>1236</sup> I also note that Professor Gans asserts that "Google increased barriers to entry through Projects Poirot and Elmo;" however, he does not provide any separate discussion of Project Elmo or otherwise examine this business practice. (Gans Report, at ¶864). Plaintiffs similarly claim that Elmo "reallocated ad spend away from rival exchanges engaged in header bidding." (Fourth Amended Complaint, at ¶403). Neither Professor Gans nor any of Plaintiffs' other experts conclude that Project Elmo harmed competition in any relevant market.

Documents in the record indicate that Project Elmo was an algorithm aimed at mitigating the effects of exchanges engaged in practices like sending multiple queries for a single ad inventory, causing advertisers to overpay, by maintaining consistency in advertiser bids across multiple calls associated with the same cookie ID over a short period. (See GOOG-DOJ-05282625, at -647-648; GOOG-DOJ-11347857, at -857; GOOG-DOJ-AT-00916355, at -355). Indeed, internal documents suggest Project Elmo benefitted "cleaner" third-party exchanges not engaged in multi-calling. GOOG-DOJ-05282625, at -650 ("We see a significant drop in exchanges that exploited this mechanism and gains for the cleaner exchanges.").

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relative to bids submitted to second-price auctions.<sup>1237</sup> Google documents indicate that some ad exchanges purporting to run second price auctions instead ran hybrid or “dirty” auctions<sup>1238</sup> and that the “goal of Poirot is to discover the exchanges that deviate from second pricing and bid appropriately on these to improve advertiser performance.”<sup>1239</sup> Poirot reduced bid amounts to ad exchange auctions where it determined that the auction did not follow second price rules. Other ad tech providers implemented their own, similar solutions to address dirty auctions. These competitors offered bid shading / bid optimizations precisely for the same reasons that DV360 did.<sup>1240</sup> For instance, bid shading is performed by a number of DSPs and exchanges, including major players like The Trade Desk and MediaMath.<sup>1241</sup> The Trade Desk even charges a fee for its bid shading algorithm called Koa.<sup>1242</sup>

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<sup>1237</sup> GOOG-DOJ-05270417, at -417 (“Poirot was launched fully on July 19, 2017”).

<sup>1238</sup> GOOG-DOJ-05282625, at -635 (“There are roughly three types of auctions: Second price (buyer bids truthfully); First price (buyer has to shave bids); Dirty (called second price, but really more like first price)”). In a first price auction, the winner of the auction pays the amount the winner bid and in a second price auction the winner pays the bid amount of the second highest bidder. In a hybrid auction, the winning bid amount will depend on the presence of other factors such as soft floors. For example, a soft floor may make a hybrid auction behave more like a first price or second price auction depending on whether the winning bid is below or above the soft floor.

<sup>1239</sup> GOOG-DOJ-13627809, at -809. *See also* GOOG-AT-MDL-C-000024439 (“Jayaram Deposition”), at 243:9-11 (“Project Poirot bids on behalf of DV360 advertisers, maximizes advertiser value or surplus while bidding to ad exchanges.”), 246:2-5 (“What Project Poirot is really doing is it’s maximizing – it’s trying to come up with the optimal bid to the exchange to maximize advertiser surplus.”).

<sup>1240</sup> *See, e.g.*, TTD\_0018624, at -625 (discussing optimization which “discover[ed] which SSPs are running first-price auctions (either by the first-price auction flag or more importantly, identifying historical first-price auction dynamics)” and adjusting bids accordingly);

 *see also* Sarah Sluis, “DSPs To SSPs: ‘Clean Up Or We Cut You Off,’” AdExchanger, May 11, 2017, available at: <https://www.adexchanger.com/platforms/dsps-ssps-clean-cut-off/>.

<sup>1241</sup> Sarah Sluis, “Everything You Need to Know About Bid Shading,” AdExchanger, March 15, 2019, available at: <https://www.adexchanger.com/online-advertising/everything-you-need-to-know-about-bid-shading/>. (“The Trade Desk charges a fee for Koa, its bid shading algorithm, where it pockets a percentage of how much buyers save on each impression. MediaMath also developed bid shading capabilities.”).

<sup>1242</sup> Sarah Sluis, “Everything You Need to Know About Bid Shading,” AdExchanger, March 15, 2019, available at: <https://www.adexchanger.com/online-advertising/everything-you-need-to-know-about-bid-shading/>. (“The Trade Desk charges a fee for Koa, its bid shading algorithm, where it pockets a percentage of how much buyers save on each impression. MediaMath also developed bid shading capabilities.”).

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648) Professor Gans characterizes Project Poirot as “increas[ing] barriers to entry ... identif[ying] when rival exchanges were not running an actual second-price auction” to suppress header bidding.<sup>1243</sup> He concludes that “Poirot resulted in reallocating revenue from rival exchanges to Google’s own exchange, which had no benefit to advertisers or publishers.”<sup>1244</sup> First, Professor Gans provides no support for his claim about entry barriers, nor empirical evidence showing the existence or importance of these barriers to entry. Professor Gans does not provide any specific examples to show any ad exchanges were denied entry as a result of the alleged practices or conduct. Second, Professor Gans acknowledges that Google launched Poirot “to identify when rival exchanges were not running an actual second-price auction” and correspondingly “adjusted the bids of DV360 in order to avoid overpaying for an impression.”<sup>1245</sup> Relatedly, Google documents indicate that some ad exchanges purporting to run second price auctions instead ran hybrid or dirty auctions.<sup>1246</sup>

649) Professor Gans claims that “Project Poirot was successful at decreasing the revenue of rival exchanges that were running non-second price auctions by [REDACTED] by sacrificing about [REDACTED] of DBM revenue.”<sup>1247</sup> But he has presented no economic evidence that Poirot set DV360 revenue sufficiently low (e.g., below marginal cost incurring short-term losses) to reduce third-party ad exchanges’ ability or incentives to compete effectively or to exclude them from any relevant antitrust market. Concerning his

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<sup>1243</sup> Gans Report, at ¶864.

<sup>1244</sup> Gans Report, at ¶865.

<sup>1245</sup> Gans Report, at ¶864. *See* GOOG-DOJ-11733552, at -576 (“Project Poirot was conceived to lower advertiser bids in first-price auctions to maximize advertiser surplus.”); GOOG-DOJ-07824651, at -651 (Google “expect[ed] the following impact” from Project Poirot: [REDACTED] across all DBM (after budget redistribution); [REDACTED] advertiser OI increase on affected inventory; [i]nventory quality neutral ...; [REDACTED] DBM net revenue increase.”).

<sup>1246</sup> *See* GOOG-DOJ-05282625, at -635.

<sup>1247</sup> Gans Report, at ¶864.

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proposition that Poirot led to a decrease in the revenue of rival exchanges, Professor Gans cites Google's launch impact study. His conclusion is that this study "shows an increase of [REDACTED] in spending in AdX while decreasing spending by [REDACTED] for Pubmatic, [REDACTED] for OpenX and [REDACTED] for Rubicon."<sup>1248</sup> What Professor Gans fails to acknowledge is that the very same study showed an increase in the ad spending in third-party exchanges—an increase in line with the increase in spending in AdX.<sup>1249</sup> More importantly, since 2019, Google has switched from second-price auctions to first-price auctions. Poirot was applicable on bids into AdX and on all third-party exchanges. When AdX moved to first price auctions, Poirot would reduce bids just like it would in any other first price auction.<sup>1250</sup> This shows that Poirot did not foreclose exchanges because it did not discriminate against rival exchanges.

650) Professor Gans concludes his analysis about Poirot by stating: "[t]hey are examples of the actions that Google could take to alter the flow of information into markets in ways that were not motivated by the needs of Google consumers (publishers/advertisers) but could disrupt the efficient operation of markets in ways that potentially reduced match quality and, potentially, and made it more difficult for rival exchanges and entrants to compete."<sup>1251</sup> Professor Gans offers no economic evidence that Google's conduct has harmed competition in the form of lower output or higher prices. Similarly,

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<sup>1248</sup> Gans Report, at ¶864.

<sup>1249</sup> According to the launch impact study, Poirot's impact on ad spending in United and Improved Digital ad exchanges was [REDACTED] and [REDACTED], respectively. (GOOG-NE-05279363, at -382).

<sup>1250</sup> For instance, Poirot limited the use of a version of RPO on AdX. GOOG-AT-MDL-012701069, at -073 ("Online RPO [:] Three potential less aggressive versions [:] Waiting on gTrade team to let us know which versions are acceptable for Poirot"), -075 ("Online RPO [:] Working on less aggressive version to avoid things like Poirot").

<sup>1251</sup> Gans Report, at ¶865.

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he provides no evidence that Google's conduct led to direct anticompetitive effects through lower quality.

651) Overall, Professor Gans does not cite to any evidence specifically related to actual effects of Project Poirot on his candidate ad exchange market as a whole. In addition, his analysis on this issue is contradicted by basic market facts: as shown by the data, third-party exchanges have witnessed an increase in the number of advertisers from DV360.<sup>1252</sup> The data also demonstrates that, from January 2016 through March 2023, nearly the same number of DV360 advertisers bought ads through several of the top rival ad exchanges as those that bought ads through Google's AdX. These trends over time are inconsistent with foreclosure outcomes and contradict Professor Gans' claims about Project Poirot.

652) Contrary to Professor Gans' assertion, Google measured the effect of Poirot after it was enabled and found that Poirot increased the surplus to advertisers by [REDACTED] and increased advertisers' ROI (in terms of clicks per dollar, conversions per dollar, and active view metrics) by [REDACTED].<sup>1253</sup>

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<sup>1252</sup> See Figure 123.

<sup>1253</sup> GOOG-DOJ-05282625, at -644 ("Advertiser impact: [REDACTED] CPD increase; [REDACTED] surplus increase ([REDACTED])"); GOOG-DOJ-05326023, at -024 ("On average we're seeing [REDACTED] improvement in ROI (clicks per dollar, conversions per dollar, active view metrics) on inventory that's purchasable with lower bids."). Contemporaneous experimental studies demonstrate positive outcomes for advertisers as additional refinements were made to Poirot. For example, prior to its launch of bid buckets, Google tested this enhancement and found that advertiser surplus associated with exchanges where Poirot would reduce bids would increase by about [REDACTED]. See GOOG-DOJ-13619370, at -371. See also GOOG-DOJ-13579782 at -783 ("From [REDACTED] experiments: Aggregated over all DBM traffic on all exchanges Surplus neutral and revenue - [REDACTED] negative (mostly BC since this is DBM) Over fixed CPM DBM traffic on all exchanges Surplus [REDACTED] and revenue - [REDACTED] > From [REDACTED] experiment Aggregated over all DBM traffic on all exchanges Surplus neutral and revenue negative but neutral. Over fixed CPM DBM traffic on all exchanges Surplus [REDACTED] and revenue - [REDACTED] Google also forecasted increases in advertiser surplus prior to launching additional Poirot refinements in 2018. An internal Google study found that changes to Poirot would result in a [REDACTED] increase in aggregate advertiser surplus on third-party exchanges. (GOOG-DOJ-12059682, at -682). Surplus is the difference between the fixed CPM, or bid amount, and the amount the advertiser actually paid for an impression. See GOOG-DOJ-11733552, at -577 ("Advertiser/surplus is a function of value - cost"). See also GOOG-DOJ-05282625, at -638 ("We are defining surplus (money saved by bidding lower and still winning) as optimization goal."). Because the fixed CPM corresponds to a bid amount, the advertiser must value the impression at least as much as the CPM because the advertiser is willing to pay the CPM amount for that impression; the CPM is therefore a lower bound on the advertiser's willingness to pay for an impression. If the advertiser can pay less for the same impression, then the advertiser gains surplus because the difference between the actual cost of the impression and advertiser's willingness to pay has increased. Advertisers benefit from increased surplus.

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These results demonstrate that Poirot provided benefits to advertisers and thus had procompetitive effects. Revealed preference also indicates that advertisers benefited from Poirot; advertisers could choose not to utilize Poirot if they did not want it and the vast majority of advertisers continued to use Poirot.<sup>1254</sup> Despite the option to opt out, over 99 percent of eligible bidders chose to keep Poirot enabled, and only approximately 1 percent of partners decided to opt out of Poirot.<sup>1255</sup>

653) Similarly, Professor Gans cites no evidence that the Facebook network bidding agreement limited the use of header bidding or otherwise harmed competition. Instead, his analysis consists solely of his speculative interpretation of documents. Professor Gans fails to conduct any empirical analysis of effects on header bidding. In fact, the data are inconsistent with the network bidding agreement harming competition. For example, he neglects to assess header bidding volumes transacted by rival ad exchanges. Review of these data finds that the volume of header bidding impressions rivals those of Google Ads and increased steadily from June 2018 through March 2023.<sup>1256</sup>

**B. Google's Conduct Harmed Neither Competition Nor Innovation**

654) Professor Gans concludes that "Google's conduct harms innovation."<sup>1257</sup> Professor Gans' discussion of harm to innovation curiously does not examine innovation in ad tech. Instead, Professor Gans asserts that "Google's conduct has allowed Google to obtain supracompetitive profits by limiting the competitive alternatives it faced ... Google monetizes its market power through its fees or 'take rate'

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<sup>1254</sup> Poirot was enabled by default for all DV360 advertisers, but advertisers had the choice to opt out by unchecking a checkbox labeled "Optimized CPM Bidding" in the DV360 user interface. *See* GOOG-DOJ-11247631, at -631; GOOG-DOJ-05326023, at -024 (checkbox found under "Optimization Fixed Bidding Settings"); GOOG-DOJ-12848608, at -632.

<sup>1255</sup> GOOG-DOJ-12848608, at -632 ("Very few (<1% partners) opted out"); GOOG-DOJ-05282625, at -644.

<sup>1256</sup> *See* Figure 134.

<sup>1257</sup> Gans Report, at ¶875.

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on AdX and Google Ads.”<sup>1258</sup> This conclusion is unreliable for several reasons. First, he provides no analysis or comparison whatsoever of the fees or take rate on Google Ads. Second, his assertion regarding AdX is based on a table that lists only five of Google’s roughly fifty competitors,<sup>1259</sup> and shows that some of those five exchanges had lower revenue shares than AdX at some point between 2013 and 2023.<sup>1260</sup> He fails to mention that three of those five exchanges actually charged higher fees than AdX.<sup>1261</sup> Third, Professor Gans has not established a causal link between the business practices at issue in this matter and the competitive harm he asserts, including Google’s prices or its “supracompetitive profits.”<sup>1262</sup> Fourth, Professor Gans’ comparison of prices ignores quality differences across exchanges. Fifth, his comparison of “[t]ake rate across different ad exchanges over time”<sup>1263</sup> in his Table 8 ignores the procompetitive benefits of Google managing its ad tech stack holistically to improve efficiency and, among other things, eliminate double marginalization.

655) Professor Gans’ simplistic view that the AdX “take rate” is a tax that “depends on the elasticities of demand and supply”<sup>1264</sup> is incomplete because, as explained earlier in my report, pricing for a multi-sided platform depends not only on advertisers’ and publishers’ elasticities, but also on the

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<sup>1258</sup> Gans Report, at ¶875.

<sup>1259</sup> Exhibit 19 shows the number of exchanges to which GAM publishers connect to sell display ads (narrow) according to AdX and DFP data.

<sup>1260</sup> See Gans Report, at Table 8.

<sup>1261</sup> Professor Gans’ Table 8 indicates that Rubicon, Pubmatic, and OpenX charged higher revenue shares than AdX. See Gans Report, at Table 8.

<sup>1262</sup> Gans Report, at ¶875.

<sup>1263</sup> Gans Report, at Table 8.

<sup>1264</sup> Gans Report, at ¶887.



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sensitivity of users and indirect network effects.<sup>1265</sup> As I explained earlier in this report, as well as in my academic research,<sup>1266</sup> these indirect network effects constrain the exercise of monopoly power. Professor Gans acknowledges that there are indirect network effects among publishers, advertisers, and users, but ignores them when considering how they impact Google's (or any other multi-sided transaction platform's) incentives and ability to exercise monopoly power.<sup>1267</sup>

656) Professor Gans has not demonstrated that Google has increased its fees as a result of the business practices at issue. To the contrary, Google's stable or declining ad tech fees are inconsistent with his theory.

**C. Reserve Price Optimization and Project Sandbox Did Not Harm Competition**

657) Plaintiffs also allege that non-Google exchanges, publishers, and advertisers are harmed by Google's Reserve Price Optimization ("RPO") program,<sup>1268</sup> which was a sell-side optimization that used historical bid data to assist in setting publisher reserve prices on AdX, enabling publishers to realize

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<sup>1265</sup> Even ignoring the sensitivity of users, "three results appear to be robust: 1) The optimal prices depend in a complex way on the price sensitivity of demand on both sides, the nature and intensity of the indirect network effects between the two sides, and the marginal costs that result from changing output of each side[;] 2) The profit-maximizing, non-predatory price for either side may be below the marginal cost of supply for that side or even negative[; and] 3) The relationship between price and cost is complex, and the simple formulas that have been derived for single-sided markets do not apply." (David S. Evans and Richard Schmalensee, "The Industrial Organization of Markets with Two-Sided Platforms," *Competition Policy International*, Vol. 3, No. 1, 2007, pp. 151-179, at p. 160).

See also "Michael R. Baye and John Morgan, "Pricing on the Internet," in *The New Palgrave Dictionary of Economics Online*, Palgrave Macmillan, 2013, at p. 3 ("The broad lesson is that optimal platform pricing is sensitive to the structure of demand on each side of the market, the set of pricing instruments available to the platform, and the nature of externalities within and between sides of the two-sided market. There is no simple or universal solution to the problem of optimal platform pricing – details matter.").

<sup>1266</sup> Michael R. Baye and John Morgan, "Pricing on the Internet," in *The New Palgrave Dictionary of Economics Online*, Palgrave Macmillan, 2013, at p. 3 ("First, despite the presence of network effects, platforms can coexist in equilibrium provided they are sufficiently differentiated. Second, these externalities actually sharpen price competition. Compared to the situation where such network effects are absent, platforms offer lower prices both as a defensive response to aggressive pricing by rivals as well as offensively to attract market share that makes their network more valuable. In equilibrium, platform pricing depends on the degree of market power and externalities on both sides of the market.").

<sup>1267</sup> See Gans Report, at ¶¶887-89.

<sup>1268</sup> Fourth Amended Complaint, at ¶¶338-39, ¶349.

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more revenue.<sup>1269</sup> Under the AdX implementation of a second price auction, the winning bidder paid the maximum of a reserve price (the maximum of the publisher price floor and the EDA price floor) and the second highest bid.<sup>1270</sup> If there was only a single bid above the reserve price, the winner would pay the reserve price for the impression. An internal Google document recognized that “[AdX] buyers pay less than half of what they bid” on average.<sup>1271</sup> Documents indicate that publishers attempted to implement their own means of closing the gap between winning bids and prices paid, including costly and complex systems for setting publisher price floors.<sup>1272</sup> Documents are consistent with Google providing a technical solution to meet publishers’ needs more efficiently.<sup>1273</sup> After the RPO launch in 2015, the reserve price that was applied in the AdX auction was the maximum of the publisher floor, the EDA price floor, and the RPO price floor.<sup>1274</sup>

658) None of Plaintiffs’ economists find that RPO harmed competition. To the contrary, although Professor Weinberg asserts that RPO led to increased ad prices for advertisers,<sup>1275</sup> it typically increased

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<sup>1269</sup> GOOG-DOJ-04937154, at -155.

<sup>1270</sup> GOOG-DOJ-13199910, at -911.

<sup>1271</sup> GOOG-DOJ-13203511. Google found that for [REDACTED] bids, the median amount the buyer paid was [REDACTED]. GOOG-DOJ-13203511, at -511.

<sup>1272</sup> GOOG-DOJ-04937154. According to a Google document, “some publishers even resorted to more extreme methods like waterfalls between exchanges, which introduce[d] latency that damage[d] the consumer experience and advertiser performance.” GOOG-DOJ-04937154, at -155.

<sup>1273</sup> GOOG-DOJ-04937154, at -155 (“Some publishers have even resorted to more extreme methods like waterfalls between exchanges, which introduces latency that damages consumer experience and advertiser performance... Optimized pricing could encourage publishers to make more inventory accessible to the open auction as well as reduce complex setups with varying ad server priority and floor prices.”).

<sup>1274</sup> GOOG-DOJ-13203643, at -652 (“Pre-revshare reserve-price = Max (RPO price, Rule-based publisher-set reserve, EDA reserve”).

<sup>1275</sup> Weinberg Report, at ¶281. (“RPO would lead to a payoff loss for advertisers since it leads to both a decrease in impressions won and an increase in the average price paid for impressions won.”).

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publisher revenue<sup>1276</sup> and had an “indeterminate” effect on AdX,<sup>1277</sup> he conducts no analysis on data to demonstrate his conclusions. Additionally, Professor Weinberg makes no attempt to balance alleged harm to advertisers and benefit to publishers, does not suggest RPO impaired the ability of third-party exchanges to compete, and therefore does not demonstrate harm to competition.<sup>1278</sup>

659) My assessment of the record indicates that implementation of RPO improved yields for publishers and reduced the complexity associated with manually set price floors.<sup>1279</sup> Internal Google experiments consistently found an anticipated increase in revenue for publishers using AdX.<sup>1280</sup> Because RPO provided a technical solution to more efficiently implement the strategies that publishers were attempting to carry out through less efficient means, RPO is more appropriately characterized as a quality-enhancing feature.<sup>1281</sup> RPO reduced the need to create these complex set ups and hence decreases

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<sup>1276</sup> Weinberg Report, at ¶¶277, 278. Although Professor Weinberg contends that Google’s alleged “concealment” of RPO might lead publishers to set suboptimal reserves (Weinberg Report, at ¶279) and that some publishers might prefer outcomes without RPO (Weinberg Report, at ¶280), this is insufficient to establish harm to competition given the net benefit to publishers.

<sup>1277</sup> Weinberg Report, at ¶286. (“The impact of RPO on AdX is indeterminate and would depend on how effective RPO is.”).

<sup>1278</sup> Weinberg Report, at ¶¶272, 278. Professor Weinberg acknowledges that RPO increased publisher revenues (Weinberg Report, at ¶278). He does not outline the effect RPO had on third-party exchanges. (Weinberg Report, at ¶272).

<sup>1279</sup> GOOG-DOJ-04937154, at -155 (“Optimized pricing effectively reduces the gap between the first price and closing price increasing publisher yield. Optimized pricing could encourage publishers to make more inventory accessible to the open auction as well as reduce complex setups with varying ad server priority and floor prices[.]”).

<sup>1280</sup> GOOG-DOJ-13199910, at -930 (“Revenue + ██████ GOOG-DOJ-13209957, at -959 (“The cookie model seems to add about ██████ incremental revenue”); GOOG-DOJ-15423317, at -319 (“The cookie pricing model alone generates about + ██████ increase in adx buyer revenue compared to no dynamic pricing. When used together with the primary (“inventory”) model, it generates + ██████ revenue increase on top of the primary model.”); GOOG-DOJ-13201274, at -275 (“Overall ██████ revenue lift”); GOOG-DOJ-13209979, at -980 (with cookie treatment, revenue impact in experiment was + ██████ GOOG-DOJ-15421397, -397 (“Cookie RPO alone gives about ██████ revenue lift”); GOOG-DOJ-14000011, at -016 (“Inventory RPO impact + ██████ on AdX buyers ... Cookie RPO impact about the same ... Combined impact: + ██████ (almost additive) on adx buyers”); GOOG-DOJ-13203511, at -512 (“Initial results show a potential revenue increase of about ██████ on AdX publishers”).

<sup>1281</sup> GOOG-DOJ-04937154, at -155. Due to the gap between the winning bid price and the clearing price before RPO, some publishers had “resorted to... waterfalls between exchanges, which introduces latency that damages consumer experience and advertiser performance.”

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the time it takes to serve an ad. This had positive effects on publishers, advertisers, and users because it enhanced the user experience and consequently increased user engagement with advertisements.<sup>1282</sup>

660) Finally, Plaintiffs allege that Google's proposal to deprecate third-party cookies in Chrome and shift to proprietary tracking mechanisms, known as "Privacy Sandbox," would "raise barriers to entry and exclude competition in the exchange and ad buying tool markets."<sup>1283</sup> However, none of Plaintiffs' economists has demonstrated harm to competition. Regardless, the most recent information about Privacy Sandbox indicates that Google is not moving forward with the deprecation of third-party cookies.<sup>1284</sup> Additionally, documents indicate that Privacy Sandbox was subject to close regulatory scrutiny and oversight as Google entered commitments with the U.K. Competition and Markets Authority to ensure that any implementation of Privacy Sandbox would satisfy its competition concerns.<sup>1285</sup>

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<sup>1282</sup> GOOG-DOJ-04937154, at -158. Google believed that RPO would help "the whole marketplace by increasing publisher yield and protecting buyers and consumers from inefficient, high latency waterfall methods." Latency is a concern as high end user latency "decreases ad engagement resulting in lower buyer ROI."

<sup>1283</sup> Fourth Amended Complaint, at ¶474. ("Google's new scheme is, in essence, to wall off the entire portion of the internet that consumers access through Google's Chrome browser. By the end of 2022, Google plans to modify Chrome to block publishers and advertisers from using the type of cookies they rely on to track users and target ads. Then, Google, through Chrome, will offer publishers and advertisers new and alternative tracking mechanisms outlined in a set of proposals that Google has dubbed 'Privacy Sandbox.' Overall, the changes are anticompetitive because they raise barriers to entry and exclude competition in the exchange and ad buying tool markets.").

<sup>1284</sup> Anthony Chavez, "A new path for Privacy Sandbox on the web," The Privacy Sandbox, July 22, 2024, available at: <https://privacysandbox.com/news/privacy-sandbox-update/>. ("Instead of deprecating third-party cookies, we would introduce a new experience in Chrome that lets people make an informed choice that applies across their web browsing, and they'd be able to adjust that choice at any time.").

<sup>1285</sup> Competition and Markets Authority, "Case 50972 – Privacy Sandbox Google Commitments Offer," available at: [https://assets.publishing.service.gov.uk/media/62052c6a8fa8f510a204374a/100222\\_Appendix\\_1A\\_Google\\_s\\_final\\_commitments.pdf](https://assets.publishing.service.gov.uk/media/62052c6a8fa8f510a204374a/100222_Appendix_1A_Google_s_final_commitments.pdf). Accessed July 29, 2024.

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**XIV. PROFESSOR PATHAK'S REMEDIES WOULD BENEFIT NO ONE AND LIKELY HARM CUSTOMERS**

661) Professor Pathak's structural and behavioral remedies rely on Professor Gans' market definition and competitive effects analysis.<sup>1286</sup> Even if Professor Gans is correct and one or more of Google's business practices harmed competition in one or more of Professor Gans' narrow candidate "tools" markets, Professor Pathak ignores the costs of his remedies, including that many of his proposals would eliminate procompetitive benefits inside and outside of each candidate market. As I have explained, these benefits arise because Google operates its ad tech stack as an integrated, multi-sided platform. Professor Pathak's proposed remedies would eliminate or reduce these procompetitive benefits by imposing (1) a structural remedy requiring Google to divest DFP,<sup>1287</sup> and/or behavioral remedies that require (2) non-discriminatory interoperability between third-party ad servers and AdX,<sup>1288</sup> (3) non-discriminatory interoperability between Google Ads and third-party ad exchanges,<sup>1289</sup> (4) non-discriminatory interoperability between DFP and third-party ad exchanges,<sup>1290</sup> or (5) internal separation and operation of Google Ads, AdX, and DFP as separate business units within Google.<sup>1291</sup>

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<sup>1286</sup> "I rely on Professor Gans' findings on market power and market definitions. I also rely on Professor Gans' findings on anticompetitive effects of Google's conduct and consider them in my proposals to resolve Google's conducts." (Pathak Report, at ¶8).

<sup>1287</sup> "Divestiture of the publisher ad server would be an appropriate remedy to increase competition." (Pathak Report, at ¶210).

<sup>1288</sup> "A non-discriminatory interoperability rule would mean that Google cannot restrict third-party ad servers [sic] ability to offer their inventory for sale through AdX." (Pathak Report, at ¶226). "A rule requiring non-discriminatory interoperability would require AdX to allow access from third-party ad servers and allow third-party ad servers to receive real-time bids from AdX." (Pathak Report, at ¶229).

<sup>1289</sup> "In the context of Google Ads and third-party exchanges, a rule requiring non-discriminatory interoperability would require Google to allow Google Ads to bid into third-party exchanges –effectively ending the exclusivity of Google Ads to AdX." (Pathak Report, at ¶233).

<sup>1290</sup> "A rule requiring non-discriminatory interoperability would require DFP to grant other exchanges the same privileges it grants AdX. For instance, a rule requiring non-discriminatory interoperability would not allow the 5% tax on exchanges using Exchange Bidding." (Pathak Report, at ¶241).

<sup>1291</sup> "Under an internal separation, DFP, AdX, Google Ads, and DV360 all would be separate business units. Each unit would have a best interested duty best interest duty [sic] to its customers (e.g., DFP would have a best interest duty to publishers) and firewalls would be in place to prevent information sharing between units." (Pathak Report, at ¶249).

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662) First, even if such a remedy did “resolve Google’s conflicts of interest ... and, therefore, remove Google’s incentive and ability to engage in similar anticompetitive conduct in the future,”<sup>1292</sup> it would also remove or reduce Google’s incentive and ability to manage other externalities holistically (through pricing and investments), thus resulting in a *smaller* pie for advertisers, publishers, and users.<sup>1293</sup>

663) For example, assuming Professor Gans is correct and Google monopolized his narrow ad exchange and publisher ad server markets (which he is not), Professor Pathak’s structural remedy of breaking ownership of AdX and DFP would create two separate entities, each charging a markup on its product. Professor Pathak’s structural remedy would unequivocally result in customers paying higher fees than they are currently paying to use AdX and DFP. As an integrated platform, Google charges lower fees as a result of the elimination of double-marginalization<sup>1294</sup> and its procompetitive incentives to account for indirect network effects within and across its ad tech stack.<sup>1295</sup> Operating AdX and DFP as independent units would diminish the incentives of both entities to make the ongoing investments

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<sup>1292</sup> Pathak Report, at ¶207 (“Structural remedies resolve Google’s conflicts of interest - by removing its dual position serving both buyers and sellers – and, therefore, remove Google’s incentive and ability to engage in similar anticompetitive conduct in the future.”).

<sup>1293</sup> I have extensively discussed how integration allows Google to beneficially manage these and other externalities throughout my report and will not repeat them here.

<sup>1294</sup> Note that the costs of Professor Pathak’s behavioral remedy requiring Google to operate Google Ads, AdX and DFP as three, independent, units (Pathak Report, at ¶249) are even higher, as it would result in triple-marginalization if (as Professor Gans asserts) Google has monopoly power in all three of these candidate markets.

<sup>1295</sup> Recall that the vast majority of customers presently do not pay any fees to use DFP. A standalone owner of DFP would likely raise standalone fees.

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necessary to improve the quality, functionality and interoperability of each stand-alone product as the industry and competition continues to evolve.<sup>1296</sup>

664) Second, Professor Pathak does not consider these and other costs that his remedies would inflict on advertisers, publishers, and users. Professor Pathak proposes that Google be required to report extensive data to advertisers and publishers at the transaction level.<sup>1297</sup> But he fails to consider or examine—given the volumes of impressions that are served every second across Google’s ad tech stack—how costly it would be or whether it is even feasible for Google to store, safely maintain and transmit such granular data. He also does not examine whether advertisers or publishers desire or can process this information. Nor does he examine whether providing this information might impact the prices Google charges customers.

665) Professor Pathak recognizes that a successful market “needs to provide thickness,” “make it safe for those who have been brought together,” and “overcome the congestion that thickness can

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<sup>1296</sup> See Section VIII. As a matter of economics, breaking ownership of AdX and DFP into two separate entities would likely create two monopolies. Economic literature makes it clear that a chain of monopolies is worse for customers than a single monopoly. As one Nobel laureate puts it: “What is worse than a monopoly? A chain of monopolies.” Jean Tirole, *The Theory of Industrial Organization*, The MIT Press, 1997, at p. 175. See also Augustin Cournot, *Researches into the mathematical principles of the theory of wealth*, MacMillan Co., 1838; Joseph Spangler, “Vertical integration and antitrust policy,” *Journal of Political Economy*, Vol. 58, No. 4, 1950, at pp. 347-352; Section VIII of this report.

<sup>1297</sup> “Disclosure of transaction data for publishers would allow publishers to request bid transaction data from AdX that includes, for all impressions, all bids submitted on the impression, floor used on the impression, publisher payout, and associated take rate for the impression. Transaction data would remain anonymized to not implicate user privacy. With access to bid and take rate data, publishers would be better positioned to audit deviations from the stated auction rules.” (Pathak Report, at ¶270).

“Disclosure of transaction data for advertisers would allow advertisers to request bid transaction data from Google Ads or DV360 that includes, for all impressions, the bid submitted to the internal auction (e.g., Google Ads auction), the bid submitted to the AdX exchange, the bid submitted to a third-party exchange, and the result of the auction. With access to bid transaction data, advertisers would be better positioned to audit deviations from the stated bidding procedures. In addition, by comparing internal auction bids with AdX or third-party exchanges, advertisers can audit how the advertiser tool bid shades across exchanges.” (Pathak Report, at ¶271).

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bring.”<sup>1298</sup> But he does not consider that an integrated company might be more capable of providing these features—and at lower cost—than a more fragmented market with independent operators that his remedies attempt to create.<sup>1299</sup> But his structural and behavioral remedies eliminate or reduce the incentive and ability of owners and operators of the ad tech at issue to account for complementarities between ad servers, ad exchanges, and buying tools—and indirect network effects between publishers, advertisers, and users. Because facilitating matches between publishers and advertisers requires getting publishers and advertisers onboard and accounting for the preferences of users, his remedies would likely make it more difficult—and more costly—to create a thick and safe market that efficiently manages congestion and other externalities. Professor Pathak’s remedies do not account for these costs.

666) Neither Professor Gans nor Professor Pathak have quantified the antitrust harm to advertisers, publishers or users stemming from Google’s alleged monopoly power.<sup>1300</sup> Nor has Professor Pathak conducted the cost-benefit calculus necessary to determine whether the potential benefits of his proposed structural or behavioral remedies would exceed the potential costs to customers and users (e.g.,

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<sup>1298</sup> “To function properly, markets need to do at least three things: 1. They need to provide thickness—that is, to bring together a large enough proportion of potential buyers and sellers to produce satisfactory outcomes for both sides of a transaction. 2. They need to make it safe for those who have been brought together to reveal or act on confidential information they may hold. When a good market outcome depends on such disclosure, as it often does, the market must offer participants incentives to reveal some of what they know. 3. They need to overcome the congestion that thickness can bring, by giving market participants enough time—or the means to conduct transactions fast enough—to make satisfactory choices when faced with a variety of alternatives.” (Pathak Report, at ¶39).

<sup>1299</sup> With respect to his structural remedy, for example, Professor Pathak asserts that “[a]n independent DFP will operate in the interests of its publisher customers, enabling publishers to trade with their preferred exchange partners on their preferred terms.” (Pathak Report, at ¶212).

<sup>1300</sup> I understand that Plaintiffs’ expert Jeffrey Andrien has provided an estimate of civil penalties, but this is not tethered to antitrust harm. (“Plaintiff States are seeking civil penalties under each State’s deceptive trade practices statutes. I have been asked to analyze certain factors that I understand are relevant to determining the applicable statutory penalties in this matter.” (Andrien Report, at ¶7). “The Plaintiff States have also brought antitrust claims against Google in this matter; however, my opinions are limited to those claims related to deceptive trade practices.” (Andrien Report, at fn. 4).



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double marginalization, reductions in incentives to innovate, reductions in quality, or the reduced functionality or inconvenience of using unintegrated technologies).

667) These costs that Professor Pathak ignores may be large relative to the potential benefits. To the extent that there are benefits from disintegration, these benefits apply to the small fraction of transactions within Professor Gans' narrow markets, which have been allegedly impacted by Google's conduct. But any potential costs of disintegration will be felt not only by these customers, but the many customers using Google's ad tech to purchase video ads, mobile in-app ads, CTV ads, and many other types of ads available on Google's platforms, as well as customers that use Google's ad tech to conduct direct deals or engage in other types of transactions using Google's ad tech that Professor Gans excludes from his analysis, such as Private Auctions.<sup>1301</sup>

668) Third, Professor Pathak's notion of "restoring competition" is inconsistent with his proposed structural remedy. Restoring competition would require first undoing all the benefits that materialized as a result of Google's investments in an integrated ad tech stack. As explained, Google's integration of its ad tech stack has created value for customers in the form of thick markets and trustworthy platforms. By eliminating this integration (through divestiture or operating Google Ads, AdX and DFP as independent units), Professor Pathak's proposed remedy would deprive customers of those related procompetitive benefits. Effectively, Professor Pathak's proposal does not restore quality at a competitive level. Professor Pathak's proposal to break ownership of AdX and DFP into two separate

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<sup>1301</sup> In Private Auctions, publishers can invite a set of buyers to bid on a portion of their ad inventory. Publishers "specify a minimum CPM floor price on a per-buyer basis, and that buyer must exceed the floor price to be eligible for the auction. The winner is determined using the same auction model that applies to Open Auctions." See Google Ad Manager Help, "Private Auctions overview," available at: <https://support.google.com/admanager/answer/2987915?hl=en>. Accessed July 27, 2024.

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entities would require eliminating all of the improvements and features Google has developed for AdX since relaunching it in 2009. And, owing to the incentives I described in Section VIII, competitive stand-alone prices for DFP would likely be above current levels. Professor Pathak's analysis confuses "conflicts of interest" with Google's incentive (as an integrated multi-sided platform) to efficiently internalize externalities across different components of the ad tech stack as well as indirect network effects among advertisers, publishers, and users. Divestiture would cause such externalities to reemerge, which would harm customers and users, and would eliminate the benefits of integration that accrue to customers and users.

669) Professor Pathak's other behavioral remedies would essentially allow Google's rivals to free-ride off past investments in the integration of its ad tech stack, and to free-ride off any future investments Google makes to improve it. For example, one of Professor Pathak's behavior remedies would require Google to conduct server-to-server header bidding for free.<sup>1302</sup> This is problematic even if his behavioral remedy regulated a positive price. In theory, if a regulator had the information necessary to set efficient prices under which rivals would pay Google for the right to connect their ad servers to AdX, it might be possible to preserve Google's incentives to make the same investments it would make in the absence of these behavioral remedies. But optimal regulatory fees would change as competition and customer preferences evolve with new technologies and changes in where and how users view content. It is highly unlikely that a regulator or any other party has the information necessary to specify

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<sup>1302</sup> Professor Pathak's behavioral remedies specify "non-discriminatory interoperability." (Pathak Report, at ¶241). Although his behavioral remedies concerning "[n]on-discriminatory interoperability between DFP ad server and third-party exchanges" expressly argue for price regulation ("a rule requiring non-discriminatory interoperability would not allow the 5% tax on exchanges using Exchange Bidding") (Pathak Report, at ¶241), his other behavior remedies implicitly require the regulation of the fees that Google charges third party ad tech companies. If they did not, they would have no effect.

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in advance such terms. Historically, while many regulators and social planners have attempted to declare prices by fiat, economic history teaches that the outcomes are often less efficient than arising even in imperfect markets.<sup>1303</sup>

670) Thus, in presenting his “remedies,” Professor Pathak fails to acknowledge any costs associated with enacting them, thus implicitly assuming, without basis, that there are none. But his proposed remedies impose their own costs on the welfare of advertisers, publishers, and users. As I have explained, Professor Gans’ narrow definition of display ads focuses on a sliver of ad types by ignoring a host of other types of ads that also flow through AdX and DFP. Professor Pathak’s proposed remedies would impact those transactions too—not only through the inability to manage inventory or purchase ads through an integrated provider, but potentially raising the market power of rival ad tech providers for these types of transactions if disintegration weakens Google’s ability to compete.

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<sup>1303</sup> “Economic theory as well as history teaches that price regulation ... is not a cure, no matter how well-intentioned.” (Michael R. Baye, “Is there a Doctor in the House,” Prepared Remarks for “Breakfast with the Federal Trade Commission Bureau Directors,” 56th Antitrust Law Spring Meeting, Washington DC, March 28, 2008, available at [https://www.ftc.gov/sites/default/files/documents/public\\_statements/there-doctor-house-value-economic-expertise-antitrust-consumer-protection-and-public-policy/080328aba.pdf](https://www.ftc.gov/sites/default/files/documents/public_statements/there-doctor-house-value-economic-expertise-antitrust-consumer-protection-and-public-policy/080328aba.pdf), at p. 2).

For discussion of the unintended consequences that may arise from regulating the price of a monopolist, see Michael R. Baye and Jeffrey Prince, *Managerial Economics and Business Strategy*, Edition 10, McGraw Hill, 2022, at p. 449.

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671) Simply put, Professor Pathak fails to consider that a remedy correcting one distortion very plausibly creates another.<sup>1304</sup> This is particularly evident in markets with externalities.<sup>1305</sup>

672) Markets with significant externalities have proven especially difficult to regulate effectively. A notable example is airlines, which was heavily regulated until the late 1970's—when the inefficiencies from regulation were simply too glaring.<sup>1306</sup> Airlines are a network industry, where greater network ownership comes both with greater concentration but greater ability to internalize externalities (e.g., the effect of schedule times for one airport pair on broader itineraries). Hence, attempts via antitrust to reduce airline size and thus network ownership necessarily come at the expense of unaccounted-for externalities. Economist Alfred Kahn, who spearheaded airline deregulation, notes the dilemma as follows: “When we turn from the normative question of what we want to the institutional question of

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<sup>1304</sup> Charles Wolf Jr., “Markets or Governments: Choosing between Imperfect Alternatives,” *RAND Corporation*, September 1986, pp. iii – 164, at pp. 20-21 (“The breakup of AT&T, after lengthy litigation in which the huge corporation was found in violation of antitrust legislation, provides an interesting example of the conflict between ... two ... types of market failure: externalities and increasing returns. To remedy one source of market failure (increasing returns), the courts have perhaps created another (externalities). Perceiving a lack of effective competition in an industry subject to increasing returns (telecommunications), the courts have replaced it by a situation in which benefits from undertaking R&D and innovation, which formerly were largely internalized by the giant AT&T, are now largely external to the seven or eight regional firms into which the industry has been split. Hence, incentives may be weakened for the newly competing entities in the telecommunications industry to undertake as aggressive efforts in R&D and technological improvement as did AT&T in the past. The disincentives arise because of the externalities that R&D generates: Competitors can free ride on the R&D expenses incurred by any one firm. By contrast, when AT&T dominated the entire market, the results of R&D and innovation were internalized by the single firm that benefited from, as well as generated, them. Hence, the free rider problem was avoided.”).

<sup>1305</sup> As I have stated elsewhere, “[w]ell-intentioned [economic] treatments—like trepanation or antibiotics—can be worse than the problem they attempt to cure. Well-intentioned interventions can have disastrous unintended consequences.” See Michael R. Baye, “Is there a Doctor in the House,” Prepared Remarks for “Breakfast with the Federal Trade Commission Bureau Directors,” 56th Antitrust Law Spring Meeting, Washington DC, March 28, 2008, available at [https://www.ftc.gov/sites/default/files/documents/public\\_statements/there-doctor-house-value-economic-expertise-antitrust-consumer-protection-and-public-policy/080328aba.pdf](https://www.ftc.gov/sites/default/files/documents/public_statements/there-doctor-house-value-economic-expertise-antitrust-consumer-protection-and-public-policy/080328aba.pdf), at p. 2.

<sup>1306</sup> Airline deregulation was via the Airline Deregulation Act in 1978. (Congress.gov, “S.2493 – Airline Deregulation Act,” available at: <https://www.congress.gov/bill/95th-congress/senate-bill/2493>. Accessed July 1, 2024). Railroads have very similar features, and were significantly deregulated via the Staggers Act in 1980. (Congress.gov, “S.1946 – Staggers Rail Act of 1980,” available at: <https://www.congress.gov/bill/96th-congress/senate-bill/1946>. Accessed July 1, 2024). A clear inefficiency during airline regulation was consistently low load factors: “CAB rules limiting routes and entry and controlling prices meant that airlines were limited to competing only on food, cabin crew quality, and frequency. As a result, both prices and frequency were high, and load factors—the percentage of the seats that were filled—were low.” (Fred L. Smith, Jr. and Branden Cox, “Airline Deregulation,” Econlib, available at: <https://www.econlib.org/library/Enc/AirlineDeregulation.html>. Accessed June 29, 2024).

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how we get it, we find ourselves launched into the baffling arena of social and political as well as economic behavior and organizations, into the real world of ignorance, error and corruption, where all institutions are in varying degrees imperfect.”<sup>1307</sup> In her discussion of airline and deregulation, Nancy Rose states it thusly: “The policy tradeoff is not between imperfect markets and perfect regulation, but choosing which flaws—market or regulatory—are less costly. In many cases, the imperfectly competitive market is far superior to inherently imperfect regulation.”<sup>1308</sup> Airline research has indeed shown post-merger improvements in performance (measured in on-time performance), which plausibly would not have been realized if the mergers were blocked.<sup>1309</sup>

673) Nonmarket failures from government intervention may be even worse in complex, highly dynamic industries like ad tech. This is because, for industries with dynamic technologies that are changing rapidly, the information asymmetry between regulators and firms is likely exacerbated.

674) Professor Pathak does not consider that his structural remedy is likely to weaken Google’s ability to compete with Meta, Microsoft, Amazon, and other large, integrated platforms. Even if customers in Professor Gans’ candidate markets were to benefit from better terms for narrow display ads, the fact that a significant percentage of the ad spend involves non-narrow display ads means that even a small reduction in Google’s ability to compete with other large platforms could reduce the terms for those types of display ads, making customers worse off overall.<sup>1310</sup> Professor Pathak’s behavioral

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<sup>1307</sup> Alfred E. Kahn, *The Economics of Regulation*, Vol. 1 and 2, John Wiley and Sons, 1970-1971, at p. xii.

<sup>1308</sup> Nancy L. Rose, “After Airline Deregulation and Alfred E. Kahn,” *American Economic Review: Papers and Proceedings*, Vol. 102, 2012, at pp. 376-380.

<sup>1309</sup> Jeffrey Prince and Daniel Simon, “The Impact of Mergers on Quality Provision: Evidence from the Airline Industry,” *Journal of Industrial Economics*, Vol. 65, 2017, at pp. 336-362.

<sup>1310</sup> See Exhibit 1.

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remedies could have similar unintended consequences, since restricting the manner in which Google can compete may reduce the vigor with which it competes against other companies.<sup>1311</sup>

675) Even if Professor Pathak's remedies were optimal under current market conditions (which he has not demonstrated), the fact that desktop narrow display ads (non-video and non-social network) account for less than 10 percent of digital advertising<sup>1312</sup> coupled with the rapid evolution of the ad tech industry means that the potential benefits of fixing a purported monopoly power problem by Professor Pathak's imperfect remedies likely pale in comparison to future costs stemming from chilling the incentives for Google and other firms to invest in solutions to mitigate harmful externalities and functionally integrate technologies to compete with present and future of ad-supported digital technologies. History teaches that regulatory solutions are far less nimble than market solutions.<sup>1313</sup> In short, even if Professor Pathak's proposed remedies were capable of efficiently managing the variety of externalities in the ad tech industry today, it is highly likely that these solutions would be suboptimal in the future.



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Michael R. Baye

August, 6 2024

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<sup>1311</sup> "Regulation and Competition – A Literature Review," Swedish Agency for Economic and Regional Growth, Report 0218, March 2017, available at: <https://tillvaxtverket.se/download/18.6855bfcf184896002ff9fa/1668765678928/Regulation%20and%20Competition.pdf>, pp. 1-24, at p. 15. ("For example, restricting a business from expanding its market share or growing its profit may reduce the vigor with which that business competes against other businesses (OECD, 2016).").

<sup>1312</sup> See Exhibit 1.

<sup>1313</sup> Alfred E. Kahn, *The Economics of Regulation*, Vol. 1 and 2, John Wiley and Sons, 1970-1971, at p. xii.

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**APPENDIX I. CURRICULUM VITAE**

**Professor Michael R. Baye**

Dr. Baye is the Bert Elwert Professor of Business at Indiana University's Kelley School of Business and an Academic Affiliate at NERA. He served as Director of the Bureau of Economics at the US Federal Trade Commission during 2007 and 2008. In his role as chief economist of the FTC, Professor Baye advised the Commission on antitrust, consumer protection, and economic policy matters.

During 2019-2021, Professor Baye served on the Academic Research Council of the US Consumer Financial Protection Bureau (CFPB), and as Chairman from October 2019 through September 2020. In this capacity he advised the CFPB about its strategic research planning process and research agenda, including views on the research that the Bureau should conduct relating to consumer financial products or services, consumer behavior, cost-benefit analysis, and other topics including technical advice and feedback on research methodologies, data collection strategies, and methodologies for quantifying the costs and benefits of regulatory actions.

Professor Baye has consulted for and advised a variety of private parties and attorneys in matters including mergers, monopolization, commercial litigation, consumer protection, and pricing strategy. He has provided economic analyses of efficiencies and potential competitive effects in merger deals reviewed by the Federal Trade Commission, the Antitrust Division of the Department of Justice, and the Canadian Competition Bureau. Dr. Baye has also provided written and oral expert testimony (including trial testimony) at the request of numerous private parties as well as state and federal authorities.

Professor Baye has won numerous awards for outstanding teaching and research, and has published several textbooks. His research focuses on pricing strategies and their impact on consumer welfare and firm profits in both online and traditional markets. His academic work on mergers, auctions, patents, advertising, online markets, and other areas related to antitrust and consumer protection has been published in leading economics and marketing journals. His work appears in the top general economics journals (the *American Economic Review*, *Journal of Political Economy*, and the *Economic Journal*), the top journals in economic theory (*Econometrica* and the *Review of Economic Studies*), as well as the top field journals in industrial organization (the *Rand Journal of Economics*, the *International Journal of Industrial Organization*, and the *Journal of Industrial Economics*). Additionally, his academic research on pricing strategies in online markets has been featured in *The Wall Street Journal*, *Forbes*, and *The New York Times*.

Professor Baye has lectured and spoken at conferences and academic institutions throughout North America and Europe, and has held visiting appointments at Cambridge, Oxford, Erasmus University, Tilburg University, and the New Economic School in Moscow. In addition to his extensive academic publications and practical antitrust experience, he has also served on numerous editorial boards in economics as well as marketing.

Dr. Baye received his BS from Texas A&M University in 1980 and his PhD in economics from Purdue University in 1983.

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## EDUCATION

**Krannert School of Management, Purdue University**  
PhD, Economics, August 1983

**Purdue University**  
MS, Economics, December 1981

**Texas A&M University**  
BS, Economics, May 1980

## PROFESSIONAL EXPERIENCE

**NERA Economic Consulting**  
2016-Present *Academic Affiliate*

**NERA Economic Consulting**  
2009-2016 *Special Consultant*

**Kelley School of Business, Indiana University**  
1997-Present *Bert Elwert Professor of Business*

**Penn State University**  
1991-97 *Associate and Full Professor of Economics*

**Texas A&M University**  
1985-91 *Assistant and Associate Professor of Economics*

**University of Kentucky**  
1983-85 *Assistant Professor of Economics*

### Government Service:

**Consumer Financial Protection Bureau**  
2019-2021 *Member, Academic Research Council*  
2019-20 *Chairman, Academic Research Council*

**Federal Trade Commission**  
2007-08 *Director, Bureau of Economics*

### Administrative, Visiting and other Positions:

Fall 2012- **Chapman University**



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Spring 2013 *Visiting Professor*

**University of Oxford (Nuffield College)**

Fall 2003 *Visiting Fellow*

**Penn State University**

Fall 2003 *Visiting Professor, E-Business Research Center*

**University of Cambridge (Corpus Christi College)**

Spring 2003 *Visiting Professor*

**University of Bonn**

Spring 2003 *Visiting Professor*

**University of Cambridge (Trinity College)**

Spring 2002 *Visiting Professor*

**University of Oxford (Nuffield College)**

Spring 2001 *Visiting Fellow*

**New Economic School, Moscow, Russia**

Fall 1995 *Visiting Professor*

**Penn State University**

1994-95 *Interim Head, Department of Economics*

**Institute for Policy Research and Evaluation**

1994-95 *Advisory Committee*

**Center for Economic Research**

1990-Present *Fellow*

**Erasmus University, Rotterdam**

1985-86 *Fulbright Professor*

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Michael R. Baye, John Morgan, and Patrick Scholten, "Persistent Price Dispersion in Online Markets," in *The New Economy and Beyond: Past, Present and Future* (D. W. Jansen, Ed.), Edward Elgar, 2006.

Michael R. Baye, Dan Kovenock, and Casper G. de Vries, "Comparative Analysis of Litigation Systems: An Auction Theoretic Approach," *Economic Journal*, Vol. 115, July 2005, pp. 583-601.

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Maria Arbatskaya and Michael Baye, "Are Prices 'Sticky' Online? Market Structure Effects and Asymmetric Responses to Cost Shocks in Online Mortgage Markets," *International Journal of Industrial Organization*, Vol. 22, No. 10, 2004, pp. 1443-1462.

Michael R. Baye and John Morgan, "Price Dispersion in the Lab and on the Internet: Theory and Evidence," *Rand Journal of Economics*, Vol. 35, No. 3, Autumn 2004, pp. 449-446.

Michael R. Baye, John Morgan, and Patrick Scholten, "Temporal Price Dispersion: Evidence from an Online Consumer Electronics Market," *Journal of Interactive Marketing*, Vol. 18, No. 4, Autumn 2004, pp. 101-115.

Michael R. Baye and Paul Kattuman, "Incentives at Cambridge in 1574," Lagniappe to *Journal of Political Economy*, Vol. 111, No. 6, December 2003.

Michael R. Baye and John Morgan, "Competition in Internet Industries: Evidence from E-Retailing," *Oxford Internet Institute: Internet Issue Brief* No. 1.2, November 2003, pp. 1-6.

Michael R. Baye and Heidrun H. Hoppe, "The Strategic Equivalence of Rent-Seeking, Innovation, and Patent-Race Games," *Games and Economic Behavior*, Vol. 44, 2003, pp. 217-226.

Michael R. Baye, John Morgan, and Patrick Scholten, "The Value of Information in an Online Consumer Electronics Market," *Journal of Public Policy & Marketing*, Vol. 22 (1), Spring 2003, pp. 17-25.

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Michael R. Baye and John Morgan, "Information Gatekeepers and Price Discrimination on the Internet," *Economics Letters*, Vol. 76 (2002), pp. 47-51.

Michael R. Baye and John Morgan, "Winner-Take-All Price Competition," *Economic Theory*, Vol. 19 (2002), pp. 271-282.

Michael R. Baye and John Morgan, "Information Gatekeepers on the Internet and the Competitiveness of Homogeneous Product Markets," *American Economic Review*, Vol. 91, No. 3 (June 2001), pp. 454-474.

Michael R. Baye and John Morgan, "A Simple Model of Advertising and Subscription Fees," *Economics Letters*, Vol. 69, No. 3 (2000) pp. 345-351.

Michael R. Baye and Onsong Shin, "Strategic Behavior in Contests: Comment," *American Economic Review*, Vol. 89, No. 3 (June 1999), pp. 691-693.

Michael R. Baye and John Morgan, "A Folk Theorem for One-Shot Bertrand Games," *Economics Letters*, Vol. 65 (1999), pp. 59-65.

Michael R. Baye and Shyh-Fang Ueng, "Commitment and Price Competition in a Differentiated-Product Duopoly," *Journal of Economics*, Vol. 69, No. 1 (1999), pp. 41-52.

Michael R. Baye, Dan Kovenock, and Casper de Vries, "The Incidence of Overdissipation in Rent-Seeking Contests," *Public Choice*, Vol. 99, No. 3/4 (June 1999), pp. 439-454.

Michael R. Baye, Robert Maness, and Steven N. Wiggins, "Demand Systems and the 'True' Cost of Living for Pharmaceuticals," *Applied Economics*, Vol. 29 (1997), pp. 1179-1189.

Michael R. Baye and Dennis W. Jansen, "Repeated Games with Stochastic Discounting," *Economica*, Vol. 63 (1996), pp. 531-541.

Michael R. Baye, Dan Kovenock, and Casper G. de Vries, "The All-Pay Auction with Complete Information," *Economic Theory*, Vol. 8 (1996), pp. 291-305.

Michael R. Baye, Keith Crocker, and Jiangdong Ju, "Divisionalization, Franchising, and Divestiture Incentives in Oligopoly," *American Economic Review*, Vol. 86 (March 1996), pp. 223-236.

Michael R. Baye, Keith Crocker, and Jiangdong Ju, "Divisionalization and Franchising Incentives with Integral Competing Units," *Economics Letters*, Vol. 50, No. 3 (March 1996), pp. 429-436.

Michael R. Baye, Dan Kovenock, and Casper de Vries, "The Solution to the Tullock Rent-Seeking Game when  $R > 2$ ," *Public Choice*, Vol. 81 (1994), pp. 363-380.

Michael R. Baye, Ann Gillette, and Casper de Vries, "Limit Orders, Asymmetric Information, and the Formation of Asset Prices with a Computerized Specialist," *Zeitschrift für Nationalökonomie / Journal of Economics*, Vol. 59, No. 1 (1994), pp. 71-96.



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- Michael R. Baye and Dan Kovenock, "How to Sell a Pickup Truck: Beat-or-Pay Advertisements as Facilitating Devices," *International Journal of Industrial Organization*, Vol. 12, No. 1 (1994), pp. 21-33.
- Michael R. Baye and Casper G. de Vries, "An Oligopoly Model of Free Banking: Theory and Tests," *De Economist*, Vol. 141, No. 4, (1993), pp. 497-514.
- Michael R. Baye, Guoqiang Tian, and Jianxin Zhou, "Characterizations of the Existence of Equilibria in Games with Discontinuous and Nonquasiconcave Payoffs," *Review of Economic Studies*, Vol. 60 (October 1993), pp. 935-948.
- Michael R. Baye, Dan Kovenock, and Casper G. de Vries, "Rigging the Lobbying Process: An Application of the All-Pay Auction," *American Economic Review*, Vol. 86 (March 1993), pp. 289-294.
- Michael R. Baye, Dan Kovenock, and Casper G. de Vries, "It Takes Two-to-Tango: Equilibria in a Model of Sales," *Games and Economic Behavior*, Vol. 4 (1992), pp. 493-510.
- Michael R. Baye, Dennis W. Jansen, and Jae-Woo Lee, "Advertising Effects in Complete Demand Systems," *Applied Economics*, Vol. 24 (1992), pp. 1087-1096.
- Michael R. Baye and Casper G. de Vries, "Mixed-Strategy Trade Equilibria," *Canadian Journal of Economics*, Vol. 25, No. 2 (May 1992), pp. 281-293.
- Michael R. Baye and Dennis W. Jansen, "Industry Performance Indices and the Economics of Information: New Perspectives and Caveats," *The Review of Industrial Economics*, Vol. 7, No. 1 (1992), pp. 83-90.
- Michael R. Baye, "Quotas as Commitment in Stackelberg Trade Equilibrium," *Jahrbucher fur NationalOkonomie and Statistik*, Vol. 209 (1992), pp. 22-30.
- Michael R. Baye and Dan A. Black, "Income Taxation, Labor Supply, and the Theory of Income-Based Cost-of-Living Indices," *European Economic Review*, Vol. 36 (1992), pp. 83-100.
- Michael R. Baye, Mary E. Deily, and Dennis W. Jansen, "Marginal and Total Production Cost Indices: Theory and Applications," *Journal of Productivity Analysis*, Vol. 2 (1991), pp. 91-102.
- Michael R. Baye and Dan A. Black, "A Differential Measure of the Real Wage Index," *Economics Letters*, Vol. 36 (July 1991), pp. 295-298.
- Michael R. Baye and Thomas F. Cosimano, "Choosing Sides in Matching Games: Nash Equilibrium and Comparative Statics," *Economica*, Vol. 57 (August 1990), pp. 295-298.
- Bernard van Praag and Michael R. Baye, "The Poverty Concept when Prices are Income-Dependent," *Journal of Econometrics*, Vol. 43 (1990), pp. 153-166.
- Paul M. Anglin and Michael R. Baye, "Information Gathering and Cost of Living Differences Among Searchers," *Economics Letters*, Vol. 28 (1988), pp. 247-250.

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Michael R. Baye and Dan A. Black, "The Microeconomic Foundations of Measuring Bracket Creep and Other Tax Changes," *Economic Inquiry*, Vol. 25 (July 1988), pp. 471-484.

Paul M. Anglin and Michael R. Baye, "Information, Multiprice Search, and Cost-of-Living Index Theory," *Journal of Political Economy*, Vol. 95 (December 1987), pp. 1179-1195.

Michael R. Baye and Thomas F. Cosimano, "Erratic Monetary Policy and the Dispersion of Commodity Prices," *Journal of Macroeconomics*, Vol. 8 (Spring 1986), pp. 201-259.

Michael R. Baye, "Population Intervals and the True Cost-of-living Index with Known Price Distributions," *Economics Letters*, Vol. 17 (1985), pp. 257-259.

Michael R. Baye, "A Note on Price Stability and Consumers' Welfare," *Econometrica*, Vol. 53 (January 1985), pp. 213-217.

Michael R. Baye, "Price Dispersion and Functional Price Indices," *Econometrica*, Vol. 53 (January 1985), pp. 217-223.

Michael R. Baye, "Review of Thomas Sowell's *Civil Rights: Rhetoric or Reality?*" *Business Horizons*, September-October 1985, pp. 79-80.

Michael R. Baye and Darrell F. Parker, "Combining Ridge and Principal Component Regression: A Money Demand Illustration," *Communications in Statistics (Theory and Methods)*, Vol. 13 (1984), pp. 197-205.

Michael R. Baye and Dan A. Black, "Indexation and the Inflation Tax," *Cato Policy Analysis*, Vol. 39 (July 1984), pp. 1-12.

Michael R. Baye, "Optimal Adjustments to Restrictions on Advertising: Some Further Comments," *Journal of Industrial Economics*, Vol. 32 (December 1983), pp. 249-251.

Michael R. Baye, "Optimal Adjustments to Changes in the Price of Advertising," *Journal of Industrial Economics*, Vol. 30 (September 1981), pp. 95-103.

Michael R. Baye and Darrell F. Parker, "The Consumption Tax and Supply Side Economics: Some Short-Term Revenue Effects," *The Cato Journal*, Vol. 1 (Fall 1981), pp. 629-632.

## SELECTED INTERNATIONAL MEETINGS

Keynote Address, Fourth Annual Consumer Financial Protection Bureau Research Conference, Washington, DC, December 2019, "Measuring Consumer Harm: Implications of Consumer Heterogeneity for Consumer Protection Policy."

Consumer Financial Protection Bureau Behavioral Law and Economics Symposium, Washington, DC, September 2019. Panel, "Methodological Foundations of Behavioral Economics."



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Consumer Financial Protection Bureau Behavioral Law and Economics Symposium, Washington, DC, September 2019. Paper: “Traditional vs. Behavioral Modeling of Consumer Decisions: Myths, Caveats and the Importance of Evidence-Based Consumer Protection.”

Federal Trade Commission Consumer Protection Economics Symposium, Washington, DC, December 2018. Panel: “The State of Consumer Protection Economics.”

Federal Trade Commission Consumer Protection Economics Symposium, Washington, DC, December 2018. Paper Presented, “Search Costs, Hassle Costs, and Drip Pricing: Equilibria with Rational Consumers and Firms.”

Keynote Address, Global Antitrust Institute/Southern Economic Association, Washington DC, November 2018, “Implications of Two-Sided Markets for Antitrust, Consumer Protection and Privacy Policies Directed at Platforms.”

Federal Trade Commission’s Competition and Consumer Protection Hearings, Panel on Big Data, Washington DC, November 2018.

Annual BCCP Conference on Regulatory Challenges in Digital Markets: Algorithms and Platform Competition, June 1, 2017, WZB Berlin Social Science Center, Berlin. Presented “Two-Sided Markets and the Sharing Economy: Nuances, Challenges and Cautionary Notes.”

Ninth Annual Federal Trade Commission Microeconomics Conference, Washington, DC, November 2016. Former Chief Economist Panel on “Economics at the FTC.”

FTC@100 Symposium: Celebrating the Bureau of Economics, Federal Trade Commission, Washington DC, September 22, 2014. “Forecasting the Future.”

OECD Competition Committee’s Roundtable on Vertical Restraints for Online Sales, Paris, France, February 26-27, 2013. Paper Presented, “Vertical Restraints in Relation to Online Sales.”

Keynote Address at the Fifth Annual Federal Trade Commission Microeconomics Conference, Washington, DC, November 2012. Keynote Address: “Online Product Search.”

NBER Digitalization Conference, Northwestern University, June 28-29, 2012. Presentation: “Searching for Physical and Digital Media: The Evolution of Platform Competition in Markets for Books, Music, and Videos.”

FTC Conference on the Economics of Drip Pricing, Washington, DC, May 2012. Panel Presentation: “What do ‘Off the Shelf’ Theory Models Say about Drip Pricing?”

OECD Competition Committee’s Second Hearing on the Digital Economy, Paris, France, February 15, 2012. Academic panelist.

FTC/DOJ Horizontal Merger Guidelines Review Project, Northwestern University Law School, December 2009. Panel Presentation: “Efficiencies.”

HIGHLY CONFIDENTIAL - SUBJECT TO PROTECTIVE ORDER

Economic Summit of Chief Economists, Competition Bureau Canada, Ottawa, Ontario, November 20-21, 2008. Panel Presentation: "Empirical Methods in Antitrust."

Keynote Address at the Research Symposium on Antitrust Economics and Competition Policy, Northwestern University Searle Center on Law, Regulation, and Economic Growth, Chicago, September 26, 2008. Keynote Address: "Antitrust Economics and Policy: Some Suggestions for Research Agendas."

Lecturer, 9<sup>th</sup> ZEW Summer Workshop for Young Economists on the Economics of Information and Communication Technologies, Mannheim (Germany), June 12-15, 2007.

WZB Conference on Advances in the Theory of Contests and Tournaments, Berlin, October 21-22, 2005. Paper Presented: "Brand and Price Advertising in Online Markets."

Keynote Speaker, 5th ZEW Conference on the Economics of Information and Communication Technologies, Mannheim (Germany), July 1, 2005.

International Industrial Organization Conference, Atlanta, April 8-9, 2005. Paper Presented: "Estimating Firm-Level Demand at a Price Comparison Site: Accounting for Shoppers and the Number of Competitors."

International Industrial Organization Conference, Boston, April 4-5, 2003. Paper Presented: "Promotion, Brand Awareness, and Price Competition in Large Online Markets."

The Frictionless Economy and the Internet, Erasmus University, Rotterdam, The Netherlands, June 1-2, 2001. Paper Presented: "Price Dispersion in the Small and Large: Evidence from an Internet Price Comparison Site."

World Congress of the Econometric Society, Seattle, Washington, August 2000. Paper presented: "Information Gatekeepers on the Internet and the Competitiveness of Homogeneous Product Markets."

Economic Theory Meetings, Rhodes, Greece, July 1-10, 1999. Paper presented: "Information Gatekeepers and the Competitiveness of Homogeneous Product Markets."

Econometric Society, Toulouse France, August 27-30, 1997. Paper presented: "Information Transmission, Information Acquisition, and Price Dispersion in 'Thin' Homogeneous Product Markets."

Tinbergen Institute Conference on Contests, Rotterdam, The Netherlands, August 22-23, 1997. Paper presented, "Fee Allocation of Lawyer Services in Litigation."

Econometric Society Summer Meetings, Pasadena California, June 26-June 29, 1997. Paper presented: "Necessary and Sufficient Conditions for Bertrand's Paradox."

American Economic Association Annual Meetings, San Francisco, CA, January 5-7, 1996. Paper Discussed: "The Effects of Price Dispersion on Cost-of-Living Indices."

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Econometric Society, Boston, MA, January 3-5, 1993. Paper presented: "The Solution to the Tullock Rent-Seeking Game when  $R > 2$ ."

Econometric Society, Brussels, Belgium, August 24-28, 1992. Paper Presented: "Efficient Rent Seeking."

World Congress of the Econometric Society, August 22-29, 1990, Barcelona, Spain. Paper presented: "The All-Pay Auction with Complete Information."

Econometric Society, September 4-9, 1989, Munich, West Germany. Paper presented: "Asymmetric Information and the Formation of Asset Prices."

European Economic Association, September 2-4, 1989, Augsburg, West Germany. Paper presented: "It Takes Two to Tango: Equilibria in a Model of Sales."

European Economic Association, August 29-September 1, 1988, Bologna Italy. Paper presented: "Mixed-Strategy Trade Equilibria."

European Economic Association, August 29-September 1, 1988, Bologna Italy. Paper presented: "The Poverty Concept when Prices are Income-Dependent."

American Economic Association, December 28-30, 1987, Chicago. Paper presented: "Stochastic Bertrand Trade Equilibria."

Econometric Society, December 28-30, 1986, New Orleans. Paper presented: "Search and Matching Equilibria When the Side of the Match is Endogenous."

Canadian Economic Association, May 26-30, 1985, Montreal. Paper presented: "Multiprice Search and the Cost of Living."

Econometric Society, December 28-30, 1982, New York. Paper presented: "A Stochastic Price Index."

Joint Council on Economic Education, June 20-25, 1982, Harvard University, Boston.

## INVITED LECTURES

Northwestern University, University of Virginia, Duke, Rochester, Cambridge, Oxford, Bonn, Michigan, Cornell, Texas, Harvard, North Carolina, Federal Trade Commission, U.S. Department of Justice, Florida, VPI, General Motors Research Laboratories, Georgetown, Bureau of Labor Statistics, Indiana, Iowa State, Katholieke Universiteit Leuven, Econometric Institute, Louis Pasteur University, Penn State, Free University of Amsterdam, Southern Methodist University, State University of New York at Buffalo, Syracuse, Tilburg, Netherlands Central Bureau of Statistics, Erasmus University Rotterdam, Texas A&M, University of Amsterdam, Illinois, Karlsruhe, Winthrop, Kentucky, Notre Dame, Western Ontario, West Virginia, Missouri, Wisconsin, Michigan State, University of British Columbia, European University Institute, University of Mannheim, University of Oklahoma,

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University of Texas-Arlington, Temple, University of Louisville, Bentley University, Vanderbilt, New York University, Chapman University.

## HONORS AND PROFESSIONAL ACTIVITIES

### Selected University Awards

Outstanding Researcher, Kelley School of Business, 1999-2000; 2003-2004; 2008-2009.

Teaching Excellence Award, Kelley School of Business, 1997-98; 1998-99; 1999-2000.

### Major International Awards, Honors and Grants

The John S. Day Distinguished Alumni Academic Service Award, Purdue University, October 11, 2012.

Best Article Prize, 2005, *Journal of Industrial Economics*, for “Price Dispersion in the Small and in the Large: Evidence from an Internet Price Comparison Site” (with John Morgan and Patrick Scholten).

Listed in *Who's Who Legal* (Competition Economists)

Listed in *Who's Who in Economics*.

Listed in *Who's Who in America*.

Listed in *Who's Who in the World*.

Fulbright Lecturer/Research Scholar Grant, Erasmus University, Rotterdam, The Netherlands, December 1985 - August 1986.

National Science Foundation Grant (SES-8410190), Adjusting Data for Distortions in the Measurement of the Cost of Living, October 1984 - March 1986.

### Editorial Boards and Service

Co-Editor, *Journal of Economics & Management Strategy* (2009 – Present)

Editor, *Advances in Applied Microeconomics* (1996 - 2007)

Editorial Board, *Economic Theory* (2004 - 2007)

Associate Editor, *Journal of Economics & Governance* (1999 - 2007)

Editorial Review Board, *Journal of Public Policy & Marketing* (2001 - 2007)

Editorial Board, *Lecture Notes in Economics and Mathematical Systems* (1999 - 2002)

### Selected Press Coverage

*Wall Street Journal*, “CFO Report: Wal-Mart Pins Growth to Multi-Channel Approach,” August 16, 2011.

*Wall Street Journal*, “The Next Generation of Price-Comparison Sites,” 14 September 2005.

*New York Times*, “Price-Comparison Sites Do the Legwork,” 3 February 2005. *Forbes*, “Getting the Price Right,” 9 November 2004.

*New York Times*, “Online Sales Offer Fresh Look at Economy,” 19 December 2002.

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**Teaching Experience**

*Undergraduate:* Economics & Public Policy, Microeconomics, Industrial Organization, Managerial Economics, Principles of Economics, Global Strategy  
*MBA:* Managerial Economics and Business Strategy  
*PhD:* Industrial Organization, Business Strategy, Microeconomic Theory

**CONSULTING ENGAGEMENTS INCLUDING WRITTEN AND ORAL TESTIMONY**

**Antitrust, Consumer Protection and Commercial Litigation**

Since 1997, retained in dozens of antitrust and consumer protection matters for clients including the Antitrust Division of the U.S. Department of Justice, the Federal Trade Commission, the Canadian Competition Bureau and private parties. In these engagements, Dr. Baye provided evaluations of the competitive effects of proposed mergers, evaluations of proposed antitrust remedies, evaluations of allegations of monopolization, evaluations of allegations of collusion, evaluations of allegations of consumer harm from misleading and deceptive advertising, evaluations of allegations of harm from unfair business practices, evaluations of allegations of harm from privacy policies, and assessments of injury and/or damages. Industries examined include aerospace, consumer goods, software, social media and other online platforms, office supply retailers, gasoline, building supplies, trash hauling, supermarkets, paper, waste disposal, railroads, telecommunications, shopping centers, online and brick-and-mortar retailing, agricultural products, healthcare, food products, shipping, medical devices, software/apps, and online search.

**Written and Oral Testimony**

*Mary Harmon, et al., v. Schell & Kampeter, Inc., d/b/a Diamond Pet Foods and/or Taste of the Wild*, Circuit Court of Jackson County, Missouri at Independence, Case No. 2016-CV17833. Expert Report filed on behalf of Diamond Pet Foods on February 1, 2023.

*District of Columbia v. Facebook, Inc.*, Superior Court of the District of Columbia, Civil Division, Case No. 2018 CA 008715 B. Expert Report filed on behalf of Facebook on March 4, 2022; deposition testimony on March 16, 2022.

*In Re: Packaged Seafood Products Antitrust Litigation*, United States Southern District Court of California, Case No. 15-MD-2670-JLS-MDD. Expert Report filed on behalf of Direct Action Plaintiffs on February 15, 2019; deposition testimony on April 17, 2019.

*Commonwealth of Kentucky v. Marathon Petroleum Company, LP*, United States Western District Court of Kentucky, Louisville Division, Case No. 3:15-cv-00354-DJH. Expert Report filed on behalf of Marathon Petroleum Company on November 5, 2018; deposition testimony on January 9, 2019.

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*In Re: Disposable Contact Lens Antitrust Litigation*, United States Middle District Court of Florida, Jacksonville Division, Case No. 1:15-md-2626-HES. Expert Vertical Merits Rebuttal Report filed on behalf of Johnson and Johnson Vision Care, Inc. and ABB Optical Group on March 30, 2018; deposition testimony on May 17, 2018. Supplemental Report filed on behalf of Johnson and Johnson Vision Care, Inc. on April 28, 2020; deposition testimony on May 14, 2020.

*Gerald D. Hosier and Hunter Creek Aviation, Inc., Claimants, v. Gulfstream Aerospace Corporation and Larry Flynn, Respondents*, Confidential Arbitration under the Commercial Arbitration Rules of the American Arbitration Association, Case No. 01-17-0002-9827. Responsive Expert Witness Statement filed on behalf of Gulfstream on November 30, 2017.

*Federal Trade Commission v. DIRECTV and DIRECTV, LLC*, United States Northern District Court of California, San Francisco Division, Case No. 15-cv-01129-HSG. Expert Rebuttal Report filed on behalf of DirecTV on October 21, 2016; deposition testimony on November 9, 2016.

Report on Confidential WTO Matter (October 6, 2015).

*Gumwood HP Shopping Partners, L.P., v. Simon Property Group, Inc.*, United States District Court for the Northern District of Indiana, South Bend Division, Case No. 3:11-CV-00268 JD-CAN. Expert Report filed on behalf of Simon Property Group, Inc. on April 3, 2015. Supplemental Report filed on or about May 22, 2015; deposition testimony on May 29, 2015; trial testimony on June 16, 2018.

*In Re: Processed Egg Products Antitrust Litigation*, United States District Court for the Eastern District of Pennsylvania, MDL Docket No. 2002 08-md-02002 (GP). Expert Report filed on behalf of Direct Action Plaintiffs on January 22, 2015. Supplemental reports filed on or about February 6, 2015 and February 17, 2015. Reply to Defendants' experts' rebuttal reports filed on April 3, 2015; deposition testimony on May 20 and 21, 2015; trial testimony on or about December 2, 2019 and December 6, 2019.

Report on Confidential WTO Matter (December 1, 2014).

*United States of America and the States of Florida and Illinois ex rel. Maureen Nehls v. Omnicare, Inc., Morris Esformes, and Philip Esformes*, United States District Court for the Northern District of Illinois, Eastern Division, Civil Action No. 07-C-5777. Expert Report filed on behalf of Omnicare, Inc. on February 17, 2012.

Oral Testimony in *Matter Involving PG Corporation*, California Franchise Tax Board, Sacramento California, February 2, 2012.

*Robert Michael Shenk, Derivatively on Behalf of Sirius XM Radio Inc. v. Melvin Alan Karmazin, et al. and Sirius XM Radio Inc.*, United States District Court for the Southern District of New York, Case No. 11-CV-02943-JSR. Expert Report filed on behalf of Sirius XM Radio Inc. on January 30, 2012; deposition testimony on February 9, 2012.

*The Commissioner of Competition v. CCS Corporation, et al.*, Competition Tribunal Case No. CT-2011-002. Testimony before the Competition Tribunal on November 17 and 18, 2011.



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*The Commissioner of Competition v. CCS Corporation, et al.*, Competition Tribunal Case No. CT-2011-002. Expert Report filed on Behalf of the Canadian Competition Bureau on September 30, 2011 and Reply Report filed on Behalf of the Canadian Competition Bureau on November 4, 2011.

*Carl Blessing, et al. v. Sirius XM Radio, Inc.*, United States District Court for the Southern District Of New York, Case No. 09-CV-10035 (HB). Deposition testimony on or about March 23, 2011.

*Carl Blessing, et al. v. Sirius XM Radio, Inc.*, United States District Court for the Southern District Of New York, Case No. 09-CV-10035 (HB). Expert Rebuttal Report filed on behalf of Sirius XM Radio Inc. on January 4, 2011.

*Carl Blessing, et al. v. Sirius XM Radio, Inc.* United States District Court for the Southern District Of New York, Case No. 09-CV-10035 (HB). Expert Report filed on behalf of Sirius XM Radio Inc. on December 3, 2010.

*Kikalos v. United States of America (98-618NDIN)*. Trial testimony on behalf of the United States of America on or about March 6, 2008. Issues: Retail Pricing and Markups.

*Waste Services, Inc. v. Waste Management Inc. et al*, U.S. District Court for the Middle District of Florida, Orlando Division, Case No. 6:05-cv-00320-ACC-DAB. Expert Report filed on behalf of Waste Services on May 31, 2006; Rebuttal Expert Report filed on August 18, 2006; deposition testimony on or about October 2006. Issues: Competition in Waste Disposal Industry.

*Wayne Smith et al. vs. Sprint Communications et al.*, US District Court for the Northern District of Illinois, Case No. 99 C 3844. Affidavit filed on or about December 2, 2002; Deposition on or about January 15, 2003. Issues: Valuation of Telecommunications Networks.

*The Commissioner of Competition v. Canadian Waste Holdings, 2000 Comp. Trib.8 File no.: CT2000002, Inc.* (Competition Tribunal, Ottawa Canada). Affidavit filed on behalf of Canada's Commissioner of Competition on or about October 11, 2000; supplemental reports and/or affidavits and hearing testimony (in Ottawa and Toronto, Canada) at various dates through November 2004. Issues: Antitrust in the Waste Disposal Industry.

*Frederick A. Uhl and Timothy Elizinga vs. Thoroughbred Technology and Telecommunications, Inc.*, U.S. District Court for the Southern District of Indiana, Indianapolis Division, Civil Action No. IP00-1232-C B/S. Affidavit filed on or about August 13, 2001. Issues: Valuation of Telecommunication Networks.

*Nick Kikalos and Helen Kikalos vs. United States of America*, U.S. District Court for the Northern District of Indiana, Eastern Division, Case No. 2:98-CV-618 (USDC ND IN). Expert Report filed on behalf of the United States of America on or about November 6, 2000; Deposition on or about February 5, 2001; Trial testimony in January 2004. Issues: Retail Pricing and Markups.

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*Firestone et al. vs. American Premier Underwriters, Inc.*, Boone County Circuit Court, Indiana (06C01-9912-CT-379). Report filed June 5, 2000; Deposed on or about September 11, 2000. Issues: Valuation of Telecommunication Networks.

*United States of America, State of New York, Commonwealth of Pennsylvania, and State of Florida v. Waste Management, Inc., Ocho Acquisition Corp., and Eastern Environmental Services, Inc.* (98 CV 7168 (FB)(MDG). Declaration filed under seal on behalf of the United States of America on or about November 17, 1998. Issues: Antitrust in the Waste Industry.

*Dr. Patricia A. Bianconi, Plaintiff, vs. Dr. Rustum Roy, Defendant*, in the Court of Common Pleas of Centre County, Pennsylvania (No. 94-900). Deposed on or about April 15, 1997; trial testimony on or about April 25, 1997. Issues: Valuation of Intellectual Capital.

**Deal/Merger Work (Public Only; Since 2010)**

*The Men's Wearhouse/Jos. A. Bank*: Assessed potential competitive effects for the parties; presented results to BE/BC teams at the Federal Trade Commission.

*Office Depot/Office Max*: Advised the Federal Trade Commission on the potential competitive effects and efficiencies of the proposed merger.

*Simon Property Group/General Growth Properties*: Assessed potential competitive effects for the parties.

*Simon Property Group/Prime Outlets*: Assessed potential competitive effects for the parties; presented results to BE/BC teams at the Federal Trade Commission.

*IESI-BFC Ltd/Waste Services International*: Advised the Canadian Competition Bureau on the potential competitive effects of the proposed merger.

*Dean Foods/Foremost Farms*: Advised the Antitrust Division of the Department of Justice on the potential competitive effects of this consummated merger.

**Pricing Strategy**

Dr. Baye has provided strategic consulting to assist clients with pricing strategies in online markets, including digital music, event tickets, and airline travel.

July 2024



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**APPENDIX II. MATERIALS RELIED UPON**

***Academic Literature and Published Books***

- Alfred E. Kahn, *The Economics of Regulation, Volume 2*, John Wiley and Sons, 1971.
- Andrea Shepard, “Contractual form, retail price, and asset characteristics in gasoline retailing,” *RAND Journal of Economics*, Vol. 24, No. 1, 1993, pp. 58-77.
- Anja Lambrecht and Catherine E. Tucker, “Can Big Data Protect A Firm from Competition?,” *CPI Antitrust Chronicle*, January 2017.
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*Declarations and Depositions*

Declaration of Nithish Korula, August 4, 2023.

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

Deposition of [REDACTED] (Google) on October 20, 2020.

Deposition of [REDACTED] (Global Publishing Platforms) on May 1, 2024.

[REDACTED]

Deposition of [REDACTED] (Google) on August 10, 2021.

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

Deposition of [REDACTED] (Google) on November 6, 2020.

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

Deposition of Nirmal Jayaram (Google) on April 26, 2024.

Deposition of Nithish Korula (Google) on October 28, 2021.

[REDACTED]  
[REDACTED]



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Deposition of [REDACTED] (Google) on May 2, 2024.

[REDACTED]

Deposition of [REDACTED] (Google) on April 3, 2024.

[REDACTED]

Deposition of [REDACTED] (Google) on April 12, 2024.

***Expert Reports and Filings***

Expert Report of Jeffrey S. Andrien, June 7, 2024.

Expert Report of John Chandler, Ph.D., June 7, 2024.

Expert Report of Joshua Gans, Ph.D., June 7, 2024.

Expert Report of Matthew Weinberg, Ph.D., June 7, 2024.

Expert Report of Parag Pathak, Ph.D., June 7, 2024.

Expert Report of Anindya Ghose, Ph.D., July 30, 2024.

Expert Report of Itamar Simonson, Ph.D., July 30, 2024.

Expert Report of Martin Rinard, Ph.D., July 30, 2024.

Expert Report of Paul R. Milgrom, Ph.D., July 30, 2024.

Fourth Amended Complaint.

***Data Production Letters***

Google Digital Advertising Antitrust Litigation, No. 1:21-md-03010 (PKC), May 30, 2023, Letter from D. Pearl to M. Mao and W. Noss.

United States, et al. v. Google LLC, No. 1:23-cv-00108-LMB-JFA, July 7, 2023 Letter from D. Pearl to K. Garcia.

United States, et al. v. Google LLC, No. 1:23-cv-00108-LMB-JFA, August 22, 2023 Letter from D. Pearl to M. Freeman.



United States, et al. v. Google LLC, No. 1:23-cv-00108-LMB-JFA, September 8, 2023 Letter from D. Pearl to M. Freeman.

United States, et al. v. Google LLC, No. 1:23-cv-00108-LMB-JFA, September 29, 2023 Letter from D. Pearl to M. Freeman.

United States, et al. v. Google LLC, No. 1:23-cv-00108-LMB-JFA, December 8, 2023, Letter from D. Pearl to M. Freeman.

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*Bates Stamped Documents*

	GOOG-AT-MDL-C-000012881.
	GOOG-AT-MDL-C-000017381.
GOOG-00054193.	GOOG-AT-MDL-C-000017978.
GOOG-AT-DOJ-DATA-000066787.	GOOG-AT-MDL-C-000018303.
GOOG-AT-DOJ-DATA-000247050.	GOOG-AT-MDL-C-000018330.
GOOG-AT-MDL-001483428.	GOOG-AT-MDL-C-000018393.
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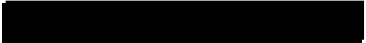
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***Google Data Sources***

<b>Data Source Name</b>	<b>Bates Start</b>	<b>Bates End</b>
ARC Data	GOOG-AT-EDTX-DATA-000258390	GOOG-AT-EDTX-DATA-000258597
DOJ RFP 50/59 GAM Bid Level Data	GOOG-AT-EDVA-DATA-000147607	GOOG-AT-EDVA-DATA-000226014
DOJ RFP 57 Autobidding Data	GOOG-AT-DOJ-DATA-000010657	GOOG-AT-DOJ-DATA-000011656

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DOJ RFP 57 Campaign Manager Data	GOOG-AT-DOJ-DATA-000247044	GOOG-AT-DOJ-DATA-000247047
DOJ RFP 57 Camry Data	GOOG-AT-DOJ-DATA-000066660	GOOG-AT-DOJ-DATA-000066660
DOJ RFP 57 Comscore April 2022 Top25Ent SocMedAWE	GOOG-AT-DOJ-DATA-000066662	GOOG-AT-DOJ-DATA-000066662
DOJ RFP 57 Comscore April 2022 Top25News SocMedAWE	GOOG-AT-DOJ-DATA-000066666	GOOG-AT-DOJ-DATA-000066666
DOJ RFP 57 Corrected Bidder Behavior Data	GOOG-AT-DOJ-DATA-000248356	GOOG-AT-DOJ-DATA-000248357
DOJ RFP 57 DFP Fees Data	GOOG-AT-DOJ-DATA-000247050	GOOG-AT-DOJ-DATA-000247053
DOJ RFP 57 DRX Internal Stats Data	GOOG-AT-DOJ-DATA-000066799	GOOG-AT-DOJ-DATA-000245943
DOJ RFP 57 DRX Internal Stats Crosswalks	GOOG-AT-DOJ-DATA-000248358	GOOG-AT-DOJ-DATA-000248374
DOJ RFP 57 eMarketer Data - "U.S. Ad Spending 2023"	GOOG-AT-DOJ-DATA-000066787	GOOG-AT-DOJ-DATA-000066787
DOJ RFP 57 Share of Wallet Data	GOOG-AT-DOJ-DATA-000247054	GOOG-AT-DOJ-DATA-000248353
DOJ RFP 57 MCM - SPM Data	GOOG-AT-DOJ-DATA-000066790	GOOG-AT-DOJ-DATA-000066796
GAM Publisher Active Line Item Data	GOOG-AT-EDTX-DATA- 001116098	GOOG-AT-EDTX-DATA- 001116098
MDL DV360 XBridge Data	GOOG-AT-MDL-DATA-000561263	GOOG-AT-MDL-DATA- 000561420
MDL RFP 243 AdSense Backfill Data	GOOG-AT-MDL-DATA-000482532	GOOG-AT-MDL-DATA- 000486515
MDL RFP 243 AdX Data	GOOG-AT-MDL-DATA-000066537	GOOG-AT-MDL-DATA- 000482007
MDL RFP 243 AdX Data Supplement	GOOG-AT-MDL-DATA- 000508827	GOOG-AT-MDL-DATA- 000558886
MDL RFP 243 AdX Data Correction	GOOG-AT-MDL-DATA- 000561536	GOOG-AT-MDL-DATA- 000564882
MDL RFP 243 DFP Reservations Data	GOOG-AT-MDL-DATA-000482008	GOOG-AT-MDL-DATA- 000482531
MDL RFP 243 DV360 Data	GOOG-AT-MDL-DATA-000488278	GOOG-AT-MDL-DATA- 000508815
MDL RFP 243 Google Ads Data	GOOG-AT-MDL-DATA-000486626	GOOG-AT-MDL-DATA- 000488277
MDL XP Daily Current Stats Data	GOOG-AT-MDL-DATA-000558890	GOOG-AT-MDL-DATA- 000559276

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GOOG-AT-MDL-DATA-000561031GOOG-AT-MDL-DATA-000561262

Category	Value
Category 1	Value 1.1
Category 2	Value 2.1
Category 3	Value 3.1
Category 4	Value 4.1
Category 5	Value 5.1
Category 6	Value 6.1
Category 7	Value 7.1
Category 8	Value 8.1
Category 9	Value 9.1
Category 10	Value 10.1
Category 11	Value 11.1
Category 12	Value 12.1
Category 13	Value 13.1
Category 14	Value 14.1
Category 15	Value 15.1
Category 16	Value 16.1
Category 17	Value 17.1
Category 18	Value 18.1
Category 19	Value 19.1
Category 20	Value 20.1
Category 21	Value 21.1
Category 22	Value 22.1
Category 23	Value 23.1
Category 24	Value 24.1
Category 25	Value 25.1
Category 26	Value 26.1
Category 27	Value 27.1
Category 28	Value 28.1
Category 29	Value 29.1
Category 30	Value 30.1
Category 31	Value 31.1
Category 32	Value 32.1
Category 33	Value 33.1
Category 34	Value 34.1
Category 35	Value 35.1
Category 36	Value 36.1
Category 37	Value 37.1
Category 38	Value 38.1
Category 39	Value 39.1
Category 40	Value 40.1
Category 41	Value 41.1
Category 42	Value 42.1
Category 43	Value 43.1
Category 44	Value 44.1
Category 45	Value 45.1
Category 46	Value 46.1
Category 47	Value 47.1
Category 48	Value 48.1
Category 49	Value 49.1
Category 50	Value 50.1
Category 51	Value 51.1
Category 52	Value 52.1
Category 53	Value 53.1
Category 54	Value 54.1
Category 55	Value 55.1
Category 56	Value 56.1
Category 57	Value 57.1
Category 58	Value 58.1
Category 59	Value 59.1
Category 60	Value 60.1
Category 61	Value 61.1
Category 62	Value 62.1
Category 63	Value 63.1
Category 64	Value 64.1
Category 65	Value 65.1
Category 66	Value 66.1
Category 67	Value 67.1
Category 68	Value 68.1
Category 69	Value 69.1
Category 70	Value 70.1
Category 71	Value 71.1
Category 72	Value 72.1
Category 73	Value 73.1
Category 74	Value 74.1
Category 75	Value 75.1
Category 76	Value 76.1
Category 77	Value 77.1
Category 78	Value 78.1
Category 79	Value 79.1
Category 80	Value 80.1
Category 81	Value 81.1
Category 82	Value 82.1
Category 83	Value 83.1
Category 84	Value 84.1
Category 85	Value 85.1
Category 86	Value 86.1
Category 87	Value 87.1
Category 88	Value 88.1
Category 89	Value 89.1
Category 90	Value 90.1
Category 91	Value 91.1
Category 92	Value 92.1
Category 93	Value 93.1
Category 94	Value 94.1
Category 95	Value 95.1
Category 96	Value 96.1
Category 97	Value 97.1
Category 98	Value 98.1
Category 99	Value 99.1
Category 100	Value 100.1

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

### **APPENDIX III. FURTHER DISCUSSION OF COMPETITION IN THE AD TECH INDUSTRY**

1) As discussed below, the ad tech of Google and its competitors allows advertisers and publishers to buy a variety of types and formats of ads.

#### **A. Advertiser Buying Tools**

2) Advertiser buying tools tend to offer advertisers the means to transact a wide variety of types of digital ads from the same tool, including display ads, video ads, and mobile app ads. These tools may permit advertisers to run campaigns that choose among these options based on algorithms such that the ultimate allocation of ads that are bought as display, mobile app, video, or otherwise, is subject to fluctuations in overall supply and demand for each of these types of ads. These tools also may offer to deploy advertisers' spend through ad networks or exchanges, allowing for efficient switching across these based on observed changes in supply and demand. And these tools offer the ability to deploy ad campaigns across a broad set of devices and content, such that the ultimate allocation of ad spend on any particular type of device or type of content is not selected in advance, or for advertisers to narrow and/or target the types of devices where their ads are shown.<sup>1314</sup>

#### **1. Google Ads**

3) Google Ads does not define display ad campaigns as limited to display ads shown on the open web. Google Ads display campaigns implicitly cover ads purchased on apps, YouTube,

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<sup>1314</sup> The Forrester Wave Report, Q2 2015, states that advertiser side tools offering includes: "Centralized management across multiple programmatic media sources, flexible machine learning and tools for improving optimization automation, and powerful audience management and predictive analytics." (GOOG-AT-MDL-B-001620063, at -067).

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Gmail, as well as websites.<sup>1315</sup> Display ad campaigns through Google Ads “are designed to show your ads in apps by default if the placement (the destination for your ad) matches the targeting you’ve set for your campaign.”<sup>1316</sup> Google Ads can also automatically deploy image and video ads into publisher ad slots to optimize the effectiveness of an advertiser’s campaign: “add videos to your responsive display ads to help maximize your reach on the Display Network. Videos are shown instead of images whenever Google Ads determines that your videos could drive better performance.”<sup>1317</sup> Google video ad campaigns are deployed not only for video streaming websites and apps, but also “in-article” on websites and apps as well as on TV screens.<sup>1318</sup>

4) Google Ads display ad campaigns that serve on third-party properties (i.e., websites and apps) by default bid into both Google Ad Manager (i.e., AdX exchange) and the AdSense network.<sup>1319</sup>

5) Google Ads provides multiples ways that advertisers can deploy a single campaign that optimizes its choice of where to purchase ads across display ads, video, and Google

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<sup>1315</sup> “Display campaigns serve visually engaging ads on the Google Display Network. The Display Network helps you reach people as they browse millions of websites, apps, and Google-owned properties (such as YouTube and Gmail).” (Google Ads Help, “About Display ads and the Google Display Network,” available at: <https://support.google.com/google-ads/answer/2404190>. Accessed April 25, 2024).

<sup>1316</sup> Google Ads Help, “Show your ads in mobile apps,” available at: <https://support.google.com/google-ads/answer/1722057?hl=en>. Accessed April 26, 2024.

<sup>1317</sup> “You can upload multiple assets per asset type (for example, multiple headlines, logos, videos, and images). Google Ads will adjust the size, appearance, and format of your ads to fit just about any available ad space using Google AI. For example, a responsive display ad might show as a banner ad on one site and a dynamic text ad on another.” (Google Ads Help, “About responsive display ads,” available at: <https://support.google.com/google-ads/answer/6363750>. Accessed April 26, 2024).

<sup>1318</sup> “Video ads on Google video partners can appear on computers, tablets, mobile web browsers, mobile apps, and TV screens. Ads are delivered within a video player or as an interstitial when shown on mobile apps.” (Google Ads Help, “About Google video partners,” available at: <https://support.google.com/google-ads/answer/7166933>. Accessed April 26, 2024).

<sup>1319</sup> “As long as you’ve targeted the Display Network for your campaign, your ads can appear on Ad Manager publisher sites, in addition to those available through Google AdSense.” (Google Ads Help, “About Display ads and the Google Display Network,” available at: <https://support.google.com/google-ads/answer/2404190>. Accessed April 25, 2024).

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properties.<sup>1320</sup> Google encourages advertisers to load these campaigns with a variety of different types of ad creatives including text, image, and video ads to be used by the campaign and provides tools to help drive advertisers to use an optimal mix of ad types.<sup>1321</sup>

## 2. *Google DV360*

6) Similar to Google Ads, DV360 does not limit its capabilities to display and video, but allows users to manage their campaigns across different ad types. “Display & Video 360 enables marketers to manage their ... campaigns across display, video, TV, audio, and other channels, all in one place.”<sup>1322</sup> Further, DV360 does not limit its ads to certain environments or types of content. Users can build line items for a variety of environments, including YouTube, Connected TV, Mobile, and Digital-Out-of-Home.<sup>1323</sup> Both of these aspects are part of DV360’s “integrated solution for end-to-end advertising campaigns.”<sup>1324</sup> Clearly, DV360 considers an end-to-end solution to include far more than just narrow display ads.

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<sup>1320</sup> Examples include “Performance Max” and “Smart campaigns[;]” “[w]ith a single Performance Max campaign, reach the customers most likely to buy from you wherever they’re browsing - on Search, YouTube, Gmail, Maps, Display, & Discovery[.]” (Google Ads, “Drive better results with Performance Max,” available at: [https://ads.google.com/intl/en\\_us/home/campaigns/performance-max/](https://ads.google.com/intl/en_us/home/campaigns/performance-max/). Accessed April 26 2024). “When you sign up for a Smart campaign, you’ll write an ad that describes your business. You’ll also choose which keyword themes you want to target your ad and set a budget. Your ad will automatically show to potential customers across Google Search, Google Maps, YouTube, Gmail, and Google partner websites.” (Google Ads Help, “How Smart campaigns work,” available at: <https://support.google.com/google-ads/answer/7652860>. Accessed April 26, 2024).

<sup>1321</sup> “Add as many versions of text, image, and video assets as possible (including different image sizes). This helps you reach consumers in more relevant ways depending on their context and mindset, and allows you to promote your business in more places. The more assets you provide, the more ad formats the campaign can create, and the more inventory your ads can appear on. Use Ad Strength to help you understand if you have the optimal asset mix, where you can improve, and to ensure you can run on all available inventory.” (Google Ads Help, “Multiply conversions with Performance Max,” available at: <https://support.google.com/google-ads/answer/11189316/>. Accessed April 26, 2024).

<sup>1322</sup> Google Marketing Platform, “Product Overview: Display & Video 360,” available at: [https://services.google.com/fh/files/misc/display\\_and\\_video\\_360\\_product\\_overview.pdf](https://services.google.com/fh/files/misc/display_and_video_360_product_overview.pdf). Accessed April 26, 2024.

<sup>1323</sup> Display & Video 360 Help, “Build line items,” available at: [https://support.google.com/displayvideo/topic/9057931?hl=en&ref\\_topic=9060428&sjid=11517590257194476040-NA](https://support.google.com/displayvideo/topic/9057931?hl=en&ref_topic=9060428&sjid=11517590257194476040-NA). Accessed April 26, 2024.

<sup>1324</sup> Google Marketing Platform, “Product Overview: Display & Video 360,” available at: [https://services.google.com/fh/files/misc/display\\_and\\_video\\_360\\_product\\_overview.pdf](https://services.google.com/fh/files/misc/display_and_video_360_product_overview.pdf). Accessed April 26, 2024.

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7) DV360 also enables advertisers to use different transaction methods. It “brings reservations and open auction buying together in one place, including all formats, inventory sources, and transaction types.”<sup>1325</sup> Marketers can therefore manage reservation, programmatic, and programmatic guaranteed campaigns all from one streamlined platform, as DV360 is not limited to just auctions.<sup>1326</sup>

8) Through DV360’s API, marketers can also automate campaign monitoring to ensure that performance across all campaigns meets the targets.<sup>1327</sup>

### 3. *Amazon Ads*

9) Amazon’s DSP on Amazon Ads gives users access to a variety of ad types; “audio ads, display ads, and video ads.”<sup>1328</sup> Additionally, Amazon Ads allows advertisers to reach audiences through different platforms, beyond just the open web; Streaming TV,<sup>1329</sup> “Amazon sites, across the web, and in mobile apps.”<sup>1330</sup>

10) In a report on Omnichannel DSPs, the Forrester Wave praised Amazon DSP for “offer[ing] a full-funnel solution with high-yielding inventory and a verifiable revenue

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<sup>1325</sup> Google Marketing Platform, “Product Overview: Display & Video 360,” available at: [https://services.google.com/fh/files/misc/display\\_and\\_video\\_360\\_product\\_overview.pdf](https://services.google.com/fh/files/misc/display_and_video_360_product_overview.pdf). Accessed April 26, 2024.

<sup>1326</sup> Google Marketing Platform, “Product Overview: Display & Video 360,” available at: [https://services.google.com/fh/files/misc/display\\_and\\_video\\_360\\_product\\_overview.pdf](https://services.google.com/fh/files/misc/display_and_video_360_product_overview.pdf). Accessed April 26, 2024.

<sup>1327</sup> Google Marketing Platform, “Automate campaign management with Display & Video 360’s API,” available at: <https://blog.google/products/marketingplatform/360/automate-campaign-management-with-display-video-360s-api/>. Accessed April 26, 2024.

<sup>1328</sup> Amazon Ads, “Amazon DSP,” available at: <https://advertising.amazon.com/solutions/products/amazon-dsp>. Accessed April 26, 2024.

<sup>1329</sup> Amazon Ads, “Sponsored TV,” available at: <https://advertising.amazon.com/products/sponsored-tv>. Accessed April 26, 2024.

<sup>1330</sup> Amazon Ads, “Amazon DSP ad dimensions and specifications,” available at: <https://advertising.amazon.com/resources/ad-specs/dsp>. Accessed April 26, 2024.



impact.”<sup>1331</sup> As part of its “full-funnel solution” Amazon DSP also enables users to “target deals across Preferred Deal, Private Auction, and Programmatic Guaranteed deal types.”<sup>1332</sup> Users can also select between different supply sources, including Amazon O&O, Amazon Publisher Direct, and 35+ third-party exchanges.<sup>1333</sup>

11) Amazon DSP’s Omnichannel Metrics feature allows users to employ AI for budget optimization and “automatically shifts budget between [the user’s] line items to maximize campaign performance while in flight.”<sup>1334</sup> As a result, Amazon DSP allows advertisers to seamlessly shift their budget from web display line items to other line items, so that advertisers rarely have to handle individual line items separately from other ad types.

#### **4. The Trade Desk**

12) The Trade Desk states that its platform allows advertisers to “seamlessly integrat[e] [their] touchpoints across screens,” specifically calling out connected TV, digital out of home (“DOOH”), audio, video, and display and that an “omnichannel strategy ensures [advertisers are] reaching [customers] at every stage of the customer journey.”<sup>1335</sup> The Trade Desk’s website describes its platform as “mak[ing] it possible to run full-funnel campaigns across multiple channels” and providing “data-driven sequential journeys across traditional and digital

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<sup>1331</sup> Forrester, “The Forrester Wave™: Omnichannel Demand-Side Platforms, Q3 2023,” available: <https://reprints2.forrester.com/#/assets/2/2601/RES178515/report>. Accessed April 26, 2024.

<sup>1332</sup> Amazon Ads, “Activate your programmatic deals faster by using the new deals widget,” available at: <https://advertising.amazon.com/resources/whats-new/activate-programmatic-deals-fasterusing-new-deals-widget>. Accessed April 26, 2024.

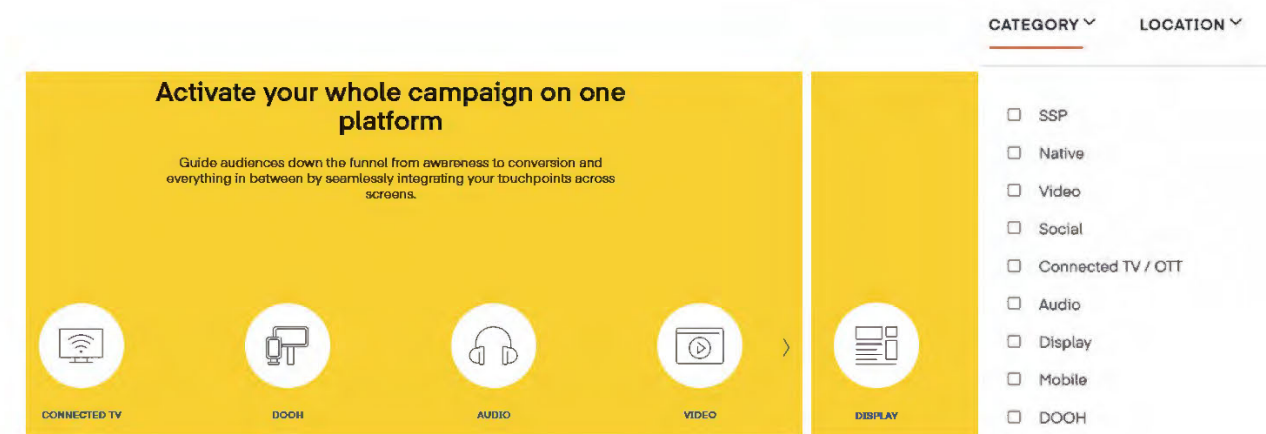
<sup>1333</sup> Amazon Ads, “Activate your programmatic deals faster by using the new deals widget,” available at: <https://advertising.amazon.com/resources/whats-new/activate-programmatic-deals-fasterusing-new-deals-widget>. Accessed April 26, 2024.

<sup>1334</sup> Amazon Ads, “Omnichannel Metrics launches for general availability,” available at: <https://advertising.amazon.com/resources/whats-new/omnichannel-metrics-launch>. Accessed April 26, 2024.

<sup>1335</sup> The Trade Desk, “Omnichannel Programmatic Advertising,” available at: <https://www.thetradedesk.com/us/our-platform/omnichannel-advertising>. Accessed April 26, 2024.

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channels.”<sup>1336</sup> Additionally, it states that “The Trade Desk offers marketers the ability to target audiences at scale across thousands of publishers and every channel, including CTV, audio, in-game, and even digital out-of-home (DOOH). On top of that, we offer cross-device technology.”<sup>1337</sup> The Trade Desk also permits advertisers to deploy ad spend across SSPs, Native ads, social media, and mobile.<sup>1338</sup>



13) The Trade Desk lists over 400 partners to which advertisers can direct their ad spend. This list includes numerous ad networks as well as ad exchanges.<sup>1339</sup> The Trade Desk has also recently launched technology to allow advertisers on its DSP to connect directly with publishers, bypassing exchanges and SSPs to buy publisher inventory.<sup>1340</sup>

<sup>1336</sup> The Trade Desk, “Omnichannel Programmatic Advertising,” available at: <https://www.thetradedesk.com/us/our-platform/omnichannel-advertising>. Accessed April 26, 2024.

<sup>1337</sup> The Trade Desk, “Finding the right frequency, part 1: myth busting,” available at: <https://www.thetradedesk.com/us/resource-desk/ideal-frequency-fine-tuning-for-optimal-results>. Accessed April 26, 2024.

<sup>1338</sup> See The Trade Desk, “Expand your reach with over 400 partners,” available at: <https://www.thetradedesk.com/us/our-platform/our-partners/partner-directory?preFilter=inventory>. Accessed April 26, 2024 (category drop down on list of partners).

<sup>1339</sup> The Trade Desk, “Expand your reach with over 400 partners,” available at: <https://www.thetradedesk.com/us/our-platform/our-partners/partner-directory?preFilter=inventory>. Accessed April 26, 2024.

<sup>1340</sup> “Inventory direct: Get direct, transparent access to inventory from leading premium publishers, right from our platform, with OpenPath.” (The Trade Desk, “The power of partnership,” available at: <https://www.thetradedesk.com/us/our-platform/our-partners>. Accessed April 26, 2024). See also The Trade Desk, “Introducing OpenPath™ — a simpler, more direct connection,” available at: <https://www.thetradedesk.com/us/resource-desk/introducing-openpath-a-simpler-more-direct-connection>. Accessed April 26, 2024; The Trade Desk, “The leading independent DSP built for data-driven marketers,” available at:

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## 5. *Criteo*

14) Criteo's advertiser buying tool, Criteo Audience Match, enables advertisers to "accurately target and re-engage [their] customer base with dynamic paid display ads across web, mobile browsers, and apps."<sup>1341</sup> Criteo defines display ads as encompassing all "visual ads placed on websites, social media networks, or apps. They are typically image, text, or video banner ads that when clicked on, take a user to a website or landing page."<sup>1342</sup> Through their platform, Criteo also provides users with access to a wide variety of ad formats: video ads; dynamic ads; adaptive ads, which "[f]eature brand images, videos, and copy that adjusts to all ad spaces;" showcase ads, which "[h]ighlight best sellers, new arrivals, or specific products;" interactive rich media ads; images ads; and more.<sup>1343</sup>

15) Criteo Engine "deliver[s] custom ads tailored for each shopper to boost conversions on [a publisher's] site."<sup>1344</sup> Criteo's Dynamic Creative Optimization+ "provides the capabilities needed to make the most engaging connection with shoppers and thus, optimizes the likelihood of a click."<sup>1345</sup> This feature automates the process of personalizing advertising design to each shopper by "build[ing] the optimal ad in the required size for each individual impression[.]"<sup>1346</sup>

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<https://www.thetradedesk.com/us/our-platform/dsp-demand-side-platform>. Accessed April 26, 2024 ("Access our transparent supply chain of quality inventory from premium publishers.").

<sup>1341</sup> Criteo, "Transform more customers into active shoppers," available at: <https://www.criteo.com/products/criteo-audience-match/>. Accessed April 3, 2024.

<sup>1342</sup> Criteo, "Display Advertising, A-to-Z," available at: <https://www.criteo.com/digital-advertising-glossary/display-advertising/>. Accessed April 26, 2024.

<sup>1343</sup> Criteo, "Ad Formats," available at: [www.criteo.com/digital-ad-formats/#video](http://www.criteo.com/digital-ad-formats/#video). Accessed April 25, 2024.

<sup>1344</sup> Criteo, "What Makes Criteo's Engine Hum? Dynamic Creative Optimization+," available at: [www.criteo.com/blog/makes-criteos-engine-hum-dco/](http://www.criteo.com/blog/makes-criteos-engine-hum-dco/). Accessed April 25, 2024.

<sup>1345</sup> Criteo, "What Makes Criteo's Engine Hum? Dynamic Creative Optimization+," available at: [www.criteo.com/blog/makes-criteos-engine-hum-dco/](http://www.criteo.com/blog/makes-criteos-engine-hum-dco/). Accessed April 25, 2024.

<sup>1346</sup> Criteo, "What Makes Criteo's Engine Hum? Dynamic Creative Optimization+," available at: [www.criteo.com/blog/makes-criteos-engine-hum-dco/](http://www.criteo.com/blog/makes-criteos-engine-hum-dco/). Accessed April 25, 2024.

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**6. Additional Advertiser Buying Tools**

16) Adobe's Advertising DSP indicates that it "is the first independent demand-side platform that brings cross-screen and cross-channel integrations for planning, buying, measurement, and optimization. It's the only omnichannel DSP that supports connected TV, video, display, native, audio, and search campaigns."<sup>1347</sup> Further, Adobe optimizes advertisers' campaigns by programmatically optimizing its goals. It does this by first "shift[ing] spend to the placements or tactics that are performing the best, according to the package's optimization goal," followed by "calculate[ing] the real-time economic KPI value for each auction per placement, and then uses this value to determine the bid."<sup>1348</sup>

17) Microsoft's Xandr Advertiser Platform, Invest DSP, "help[s] advertisers engage with audiences using Connected TV, digital video, display, native, audio, and digital out-of-home environments."<sup>1349</sup> Invest DSP integrates with Microsoft (Xandr)'s omnichannel supply architecture to give users "more options to buy media including reserved buying and access to curated deal catalogues."<sup>1350</sup> Through its Augmented Line Item optimization, Invest DSP also aids

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<sup>1347</sup> Adobe Experience Cloud, "One demand-side platform to rule them all," available at: <https://business.adobe.com/products/advertising/demand-side-platform.html>. Accessed April 25, 2024.

<sup>1348</sup> Adobe Advertising, "Optimization," available at: <https://experienceleague.adobe.com/en/docs/advertising/dsp/introduction/features/optimization>. Accessed April 25, 2024; Adobe Advertising, "How Advertising DSP Optimizes Your Campaigns," available at: <https://experienceleague.adobe.com/en/docs/advertising/dsp/optimization/optimization-how-dsp-optimizes-campaigns>. Accessed April 25, 2024.

<sup>1349</sup> Microsoft Advertising, "Advertiser Platform," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/advertiser-platform-invest-dsp-premium-content>. Accessed April 25, 2024.

<sup>1350</sup> Microsoft Advertising, "Advertiser Platform," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/advertiser-platform-invest-dsp-premium-content>. Accessed April 25, 2024.

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users by “automatically manag[ing] pacing, budget allocation, inventory discovery, inventory valuation, and other tasks.”<sup>1351</sup>

18) The ability to manage advertiser campaigns across a variety of formats, channels, and transaction types that Professor Gans has excluded from his candidate open web display markets is not limited to large ad tech companies alone. For example, Eskimi’s DSP manages ad campaigns across “Display, Mobile, Native, In-Game, CTV & Video.”<sup>1352</sup> Users also get access to “a variety of ad types, such as static banner ads, video, interactive rich media, and much more.”<sup>1353</sup> Eskimi integrates with over 60 ad exchanges, allowing users to choose between a wide range of ad supply sources.<sup>1354</sup> Their targeting options enable users to build a strong target strategy based on how users react to ads and based on a wide variety of audience categories.<sup>1355</sup>

**B. Ad Exchanges**

19) Ad Exchanges tend to offer advertisers and publishers the means to buy and sell a wide variety of types of digital ads inventory from the same tool, including display ads, video ads, and mobile app ads. Exchanges may allow for different means of transacting, such as programmatic guaranteed. Exchanges also offer the ability to transact across a broad set of devices and content, such that the ultimate allocation of ad spend on any particular type of device or type of content is not selected in advance.

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<sup>1351</sup> Xandr platform, “Microsoft Invest – Optimization guide (ALI),” available at: <https://learn.microsoft.com/en-us/xandr/invest/optimization-guide-ali>. Accessed April 25, 2024.

<sup>1352</sup> Eskimi, “Your Global Demand-Side Platform,” available at: <https://www.eskimi.com/dsp>. Accessed April 26, 2024.

<sup>1353</sup> Philip Mahler, “25 Programmatic Advertising Platforms You Should Try In 2024,” Eskimi, April 22, 2024, available at: <https://www.eskimi.com/blog/programmatic-advertising-platforms>. Accessed April 26, 2024.

<sup>1354</sup> Eskimi, “Your Global Demand-Side Platform,” available at: <https://www.eskimi.com/dsp>. Accessed April 26, 2024.

<sup>1355</sup> Eskimi, “Advanced Targeting & Global Reach,” available at: <https://www.eskimi.com/targeting>. Accessed April 26, 2024.

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**1. Google Ad Manager (AdX)**

20) Google Ad Manager (AdX) does not limit inventory accessed by customers to only display ads on the open web. Google's Ad Manager Help page indicates that it supports banner ads, including where banners are run "with a video creative."<sup>1356</sup> GAM indicates that it can handle a variety of formats, of which banner ads are merely one type. These include native ads, instream video ads, rewarded ads that appear on mobile or desktop games, and full screen pop up ads that appear as a website or mobile user scrolls (interstitial ads).<sup>1357</sup> All inventory formats can be filled with either display or video creatives.<sup>1358</sup> Additionally, Google Ad Manager allows for the transacting of inventory across different types of content, such as mobile web, mobile app, desktop, and CTV.<sup>1359</sup> Banner, Native, Interstitial, and Rewarded ads include mobile web, mobile app, and desktop as supported inventory types, while In-Stream ads are supported across all mobile, desktop, and CTV inventory types.<sup>1360</sup>

21) Since January 2016, Google Ad Manager has offered the option to transact through Programmatic Guaranteed to both advertisers and publishers.<sup>1361</sup> This tool "use[s] real-time bidding infrastructure to bring the power of programmatic to direct sales."<sup>1362</sup>

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<sup>1356</sup> Google Ad Manager Help, "Inventory Formats," available at: <https://support.google.com/admanager/answer/9796545?hl=en>. Accessed April 24, 2024.

<sup>1357</sup> Google Ad Manager Help, "Inventory Formats," available at: <https://support.google.com/admanager/answer/9796545>. Accessed April 24, 2024.

<sup>1358</sup> Google Ad Manager Help, "Inventory Formats," available at: <https://support.google.com/admanager/answer/9796545>. Accessed April 24, 2024.

<sup>1359</sup> Google Ad Manager Help, "Inventory Formats," available at: <https://support.google.com/admanager/answer/9796545>. Accessed April 24, 2024.

<sup>1360</sup> Google Ad Manager Help, "Inventory Formats," available at: <https://support.google.com/admanager/answer/9796545>. Accessed April 24, 2024.

<sup>1361</sup> Kurt Spoere, "Programmatic Guaranteed: Now available to advertisers, publishers globally," Google Ad Manager, available at: <https://blog.google/products/admanager/programmatic-guaranteed-now-available/>. Accessed April 24, 2024.

<sup>1362</sup> Kurt Spoere, "Programmatic Guaranteed: Now available to advertisers, publishers globally," Google Ad Manager, available at: <https://blog.google/products/admanager/programmatic-guaranteed-now-available/>. Accessed April 24, 2024.

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## 2. *Microsoft (Xandr)*

22) Microsoft's Xandr Monetize SSP offers access to inventory beyond simply display ads on the open web. "Xandr's supply-side platform (SSP) powers monetization through advanced tools to manage demand for all channels and formats—from display to Connected TV (CTV) to native," according to their website.<sup>1363</sup>

23) Microsoft's Xandr Monetize platform allows customers "to target universal or custom content categories."<sup>1364</sup> Inventory types include ads that "[run] in applications installed on mobile tablets, phones, and Windows 8 devices" as well as ads that "[run] on standard websites and those optimized for browsers on mobile devices."<sup>1365</sup>

24) Microsoft's Xandr Monetize platform additionally allows for customers to "[c]reate a programmatic guaranteed buying line item" which "provides [customers] with a workflow specifically designed for buying a programmatic guaranteed deal."<sup>1366</sup>

## 3. *Magnite*

25) Magnite's SSP allows advertisers and publishers to transact across a variety of ad formats and does not limit transactions to display ads on the open web. Magnite's website highlights that through their platform, customers can "[m]aximize revenue for Display, Online Video, Audio, Native and Digital Out-of-Home with our powerful and flexible Supply-Side

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<sup>1363</sup> Microsoft Advertising, "Publisher Platforms," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/publisher-platforms-scaled-buying-selling-solutions>. Accessed April 24, 2024.

<sup>1364</sup> Microsoft Learn, "Microsoft Monetize – Set up line item inventory and brand safety (PGLI)," available at: <https://learn.microsoft.com/en-us/xandr/monetize/set-up-line-item-inventory-and-brand-safety-pgli-monetize>. Accessed April 24, 2024.

<sup>1365</sup> Microsoft Learn, "Microsoft Monetize – Set up line item inventory and brand safety (PGLI)," available at: <https://learn.microsoft.com/en-us/xandr/monetize/set-up-line-item-inventory-and-brand-safety-pgli-monetize>. Accessed April 24, 2024.

<sup>1366</sup> Microsoft Learn, "Microsoft Monetize – Create a programmatic guaranteed buying line item," available at: <https://learn.microsoft.com/en-us/xandr/monetize/create-a-programmatic-guaranteed-buying-line-item>. Accessed April 24, 2024.

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Platform and header bidding software.”<sup>1367</sup> Magnite additionally allows for customers to transact across multiple ad formats, such as video, in addition to display ads. Business Insider was able to use “Magnite’s multi-format functionality to make display ad units available to outstream video demand, leading to increased bid request CPMs and streamlined supply onboarding for multiple formats”<sup>1368</sup>

26) Magnite’s SSP offers customers the ability to transact through additional venues, stating on their website that customers can “[c]onduct business your way with robust Programmatic Guaranteed (PG), Private Marketplaces (PMP), and Auction Package capabilities.”<sup>1369</sup> In 2018, Magnite (formerly known as Rubicon), provided access to its private marketplaces to third-party DSPs, which “provid[ed] integrated partners with detailed signals in the bid stream for guaranteed buying in private marketplaces.”<sup>1370</sup> Magnite additionally offers a streaming-specific SSP, through which customers can transact CTV and other video ad formats.<sup>1371</sup> This streaming SSP also offers programmatic guaranteed deals, which customers can access through third-party DSPs in the same way as Magnite’s traditional format SSP. Amazon Ads details this relationship, noting that, “[p]rogrammatic guaranteed deals enable direct buys between advertisers and publishers, while still benefiting from the programmatic model.

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<sup>1367</sup> Magnite, “Sellers,” available at: <https://www.magnite.com/sellers/>. Accessed April 24, 2024.

<sup>1368</sup> Magnite Team, “Business Insider Achieved 50%+ Uplift in Bid Request CPMs Using Magnite’s Prebid Multi-Format Capabilities,” Magnite, available at: <https://www.magnite.com/case-studies/business-insider-achieved-50uplift-in-bid-request-cpms-using-magnites-prebid-multi-format-capabilities/>. Accessed April 25, 2024.

<sup>1369</sup> Magnite, “Sellers,” available at: <https://www.magnite.com/sellers/>. Accessed April 24, 2024.

<sup>1370</sup> Magnite, “Rubicon Project Opens Up its Guaranteed Private Marketplaces to Third-Party DSPs,” available at: <https://investor.magnite.com/news-releases/news-release-details/rubicon-project-opens-its-guaranteed-private-marketplaces-third>. Accessed April 24, 2024.

<sup>1371</sup> Magnite, “Sellers,” available at: <https://www.magnite.com/sellers/>. Accessed April 24, 2024.



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Advertisers will be able to access additional streaming TV and online video publishers through Magnite Streaming.”<sup>1372</sup>

#### **4. PubMatic**

27) PubMatic’s SSP allows customers to access inventory not limited to display ads on the open web. Through the PubMatic SSP, customers transact “across the channels and formats that matter: CTV, online video, mobile app, web, and beyond.”<sup>1373</sup> PubMatic additionally offers OpenWrap, which is their “unified header bidding solution ... [that] is built on Prebid,”<sup>1374</sup> and provides access to web, CTV/OTT, and SDK inventory.<sup>1375</sup>

28) PubMatic released Activate in 2023, which “allows brands and agencies to buy CTV and online video inventory through PubMatic via direct deals, including programmatic guaranteed and private marketplaces.”<sup>1376</sup>

#### **5. Index Exchange**

29) Index Exchange operates “an omnichannel exchange ... [that] enables media owners and buyers to transact across the spectrum of programmatic ad formats within a single platform.”<sup>1377</sup> These formats include streaming video, mobile app, native, web banner, and video

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<sup>1372</sup> Amazon Ads, “Leverage new inventory sources with programmatic guaranteed deals for Video,” available at: <https://advertising.amazon.com/resources/whats-new/leverage-new-inventory-sources-with-programmatic-guaranteed-deals-for-video>. Accessed April 24, 2024.

<sup>1373</sup> PubMatic, “PubMatic SSP: Maximize Advertising Revenue and Control How Your Audiences are Accessed,” available at: <https://pubmatic.com/products/pubmatic-ssp-for-publishers/>. Accessed April 24, 2024.

<sup>1374</sup> PubMatic, “Meet OpenWrap: revenue and Control in One Unified Header Bidding Solution,” available at: <https://pubmatic.com/products/openwrap/>. Accessed April 24, 2024.

<sup>1375</sup> PubMatic, “Meet OpenWrap: revenue and Control in One Unified Header Bidding Solution,” available at: <https://pubmatic.com/products/openwrap/>. Accessed April 24, 2024.

<sup>1376</sup> Anthony Vargas, “PubMatic Cuts DSPs Out of Direct CTV and Online Video Ad Buys,” AdExchanger, May 8, 2023, available at: <https://www.adexchanger.com/digital-tv/pubmatic-cuts-dsps-out-of-direct-ctv-and-online-video-ad-buys>.

<sup>1377</sup> Index Exchange, “Channels and Formats,” available at: <https://www.indexexchange.com/product/channels-formats/>. Accessed April 24, 2024.

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ads.<sup>1378</sup> Index Exchange additionally “works with the world’s largest and most trusted media owners, providing direct access to premium display, video, CTV, mobile, and native ad inventory via a single platform.”<sup>1379</sup>

30) Index Exchange offers “support for the full range of open market, direct, and private transactions” through its exchange, allowing customers to access whichever type of transaction best suits their needs.<sup>1380</sup> Customers do not have to utilize multiple services to access programmatic guaranteed and open bidding transactions.

#### **6. Header Bidding Wrappers**

31) Amazon Publisher Service’s TAM is a cloud-based header bidding solution that allows publishers “access to broad demand from Amazon’s huge transparent ad marketplace ... it also allows publishers to incorporate demand from other header bidders to compete with Amazon demand in a unified auction”<sup>1381</sup> “TAM supports pre-roll video and display banners for websites (both desktop and mobile). With the integration of a software development kit (SDK), you can also run video and display units in mobile apps via TAM.”<sup>1382</sup> Amazon UAM (Unified Ad

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<sup>1378</sup> Index Exchange, “Channels and Formats,” available at: <https://www.indexexchange.com/product/channels-formats/>. Accessed April 24, 2024.

<sup>1379</sup> Index Exchange, “For Marketers and Agencies,” available at: <https://www.indexexchange.com/solution/marketers-agencies/>. Accessed June 30, 2024.

<sup>1380</sup> Index Exchange, “Exchange Access and Transactions,” available at: <https://www.indexexchange.com/product/exchange-access-transactions/>. Accessed July 29, 2024.

<sup>1381</sup> Playwire, “What is Amazon TAM?” available at: <https://www.playwire.com/blog/what-is-amazon-tam>. Accessed August 4, 2024.

<sup>1382</sup> Playwire, “What is Amazon TAM?” available at: <https://www.playwire.com/blog/what-is-amazon-tam>. Accessed August 4, 2024.

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Marketplace) functions similarly to TAM (“header bidding solutions that operate on a server-side model”), but primarily focuses on smaller publishers.<sup>1383</sup>

32) Prebid Universal Creative offers an open-source header bidding solution that “can pull a particular ad ID from Prebid’s cache and do the right thing to display it.”<sup>1384</sup> Prebid allows users to transact across a number of different ad formats and channels, including web banner, outstream video, and native across web and mobile apps.<sup>1385</sup> By definition, Prebid (and header bidding generally) allows “multiple demand partners to bid on each ad impression simultaneously,” which “maximiz[es] the utilization of ... digital real estate” without significant effort by publishers and advertisers.<sup>1386</sup>

33) Google Open Bidding simplifies header bidding by “facilitate[ing] real-time bidding between exchanges and publisher ad requests.”<sup>1387</sup> Open Bidding partners with many exchanges to offer a wide variety of ad inventory in addition to display ads on the open web. Display ads are offered across desktop web, mobile web, interstitial, native, and mobile app channels. In-stream

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<sup>1383</sup> Playwire, “What is Amazon TAM?” available at: <https://www.playwire.com/blog/what-is-amazon-tam>. Accessed August 4, 2024.

<sup>1384</sup> Prebid, “Prebid Universal Creative,” available at: <https://docs.prebid.org/overview/prebid-universal-creative.html>. Accessed April 25, 2024.

<sup>1385</sup> Prebid, “Prebid Universal Creative,” available at: <https://docs.prebid.org/overview/prebid-universal-creative.html>. Accessed April 25, 2024.

<sup>1386</sup> Advergin, “What is Prebid? A Game-Changing Ad Tech Solution for Publishers,” February 6, 2024, available at: <https://advergin.com/blogs/what-is-prebid-a-game-changing-ad-tech-solution-for-publishers/>.

<sup>1387</sup> Google Ad Manager Help, “Introduction to Open Bidding,” available at: <https://support.google.com/admanager/answer/7128453>. Accessed June 22, 2024.

video and audio ads are also available through partnered exchanges.<sup>1388</sup> Open Bidding allows users to set up programmatic guaranteed deals to transact across both standard and PG options.<sup>1389</sup>

### **C. Publisher Ad Servers**

34) Publisher Ad Servers tend to offer publishers options to fill open ad space with a wide variety of types of digital ads inventory, including display ads, video ads, and mobile app ads. These tools may permit publishers to fill ad space with ad creatives that choose among these options based on algorithms such that the ultimate allocation of ads shown as display, mobile app, video, or otherwise, is subject to fluctuations in overall supply and demand for each of these types of ads. These tools also may allow for different means of filling ad space, such as programmatic guaranteed. And these tools offer the ability to fill ad space with a broad set of devices and content, such that the ultimate allocation of ad spend on any particular type of device or type of content is not selected in advance.

#### ***1. Google Ad Manager (DFP)***

35) Google Ad Manager (formerly known as DoubleClick for Publishers) allows publishers to fill ad space with a wide variety of ad formats beyond display ads. They also “deliver immersive ad experiences across any device or platform ... with a wide variety of innovative ad formats, such as out-stream videos, rewarded ads, and more.”<sup>1390</sup> Additionally, Google Ad Manager allows for the transacting of inventory across different types of content, such as mobile

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<sup>1388</sup> Google Ad Manager Help, “Introduction to Open Bidding,” available at: <https://support.google.com/admanager/answer/7128453>. Accessed June 22, 2024.

<sup>1389</sup> Authorized Buyers Help, “Real-time Bidding differences for Programmatic Guaranteed Deals,” available at: <https://support.google.com/authorizedbuyers/answer/7174589?hl=en>. Accessed April 25, 2024.

<sup>1390</sup> Google Ad Manager, “Delight with every ad format,” available at: <https://admanager.google.com/home/capabilities/formats/>. Accessed April 25, 2024.

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web, mobile app, desktop, and CTV.<sup>1391</sup> Banner, Native, Interstitial, and Rewarded ads include mobile web, mobile app, and desktop as supported inventory types, while In-Stream ads are supported across all mobile, desktop, and CTV inventory types.<sup>1392</sup>

36) Google Ad Manager allows for different forms of transacting ad space, such as Programmatic Guaranteed, which “simplifies the direct reservations workflow by combining the precision and control of programmatic technology with an automated media buying process; which helps secure ... revenue for publishers.”<sup>1393</sup>

37) Google Ad Manager’s Optimized competition feature “lets [users] improve overall yield on inventory eligible for dynamic allocation across Ad Manager, through increased competition between direct and indirect sales in a fully automated manner.”<sup>1394</sup> When activated, users of Google Ad Manager are eligible to fill their inventory with whatever remnant line items, authorized buyers, or Open Bidding buyers exist and are willing to pay for the inventory.<sup>1395</sup> Through this process, GAM publishers do not pre-select the type of ad that will be served through their ad space and instead let GAM’s automated process control the fill process.

## 2. *Microsoft (Xandr)*

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<sup>1391</sup> Google Ad Manager Help, “Inventory Formats,” available at: <https://support.google.com/admanager/answer/9796545>. Accessed April 24, 2024.

<sup>1392</sup> Google Ad Manager Help, “Inventory Formats,” available at: <https://support.google.com/admanager/answer/9796545>. Accessed April 24, 2024.

<sup>1393</sup> Google Ad Manager, “Modernize your direct deals with Programmatic Guaranteed,” available at: <https://admanager.google.com/home/resources/feature-brief-programmatic-guaranteed/>. Accessed April 25, 2024.

<sup>1394</sup> Google Ad Manager Help, “Optimized competition,” available at: <https://support.google.com/admanager/answer/7422526?hl=en>. Accessed April 25, 2024.

<sup>1395</sup> Google Ad Manager Help, “Optimized competition,” available at: <https://support.google.com/admanager/answer/7422526?hl=en>. Accessed April 25, 2024.

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38) Microsoft's Xandr Ad Server allows publishers to facilitate ad fill across their entire suite of formats, including "desktop, mobile, and in-app inventory."<sup>1396</sup> Through Xandr Ad Server, users are not limited to display ads on the open web, and can seamlessly integrate ad space in a wide range of formats.

39) Microsoft's Xandr Ad server allows for users to transact through multiple formats, including programmatic guaranteed. Xandr documentation summarizes the process for "[s]etting up an API implementation for a programmatic guaranteed (PG) deal through Microsoft Monetize Ad Server."<sup>1397</sup>

40) Xandr Ad Server facilitates the filling of ad space through a seamless, automated system of open dynamic allocations, which allows "rival demand sources [to] compete inside the ad server ... allowing [customers] to accept higher programmatic bids and generate superior CPMs whilst ensuring guaranteed campaigns ... still achieve their delivery goals."<sup>1398</sup> Through this process, publishers do not need to specifically select "different demand sources along a strict hierarchy" to access different demand sources.<sup>1399</sup>

### 3. *Kevel*

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<sup>1396</sup> Xandr, "Xandr + Axel Springer," available at: <https://dl.xandr.com/2019/09/Axel-Springer-Ad-Server-Case-Study-in-English.pdf>. Accessed April 25, 2024.

<sup>1397</sup> Microsoft Learn, "Microsoft Monetize ad server for Programmatic Guaranteed deal," available at: <https://learn.microsoft.com/en-us/xandr/digital-platform-api/programmatic-guaranteed-deal-through-monetize-ad-server-api-setup-guide>. Accessed April 25, 2024.

<sup>1398</sup> Xandr, "Xandr + Axel Springer," available at: <https://dl.xandr.com/2019/09/Axel-Springer-Ad-Server-Case-Study-in-English.pdf>. Accessed April 25, 2024.

<sup>1399</sup> Xandr, "Xandr + Axel Springer," available at: <https://dl.xandr.com/2019/09/Axel-Springer-Ad-Server-Case-Study-in-English.pdf>. Accessed April 25, 2024.

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41) Kevel Ad Server supplies ad inventory to customers with a wide variety of ad space formats through a single tool. Through the Kevel Ad Servers, users can “[m]onetize [thei]r website, app, and DOOH platforms with tailored advertising.”<sup>1400</sup>

42) Through Kevel Ad Server, publishers can transact ad space through multiple transaction types, including programmatic guaranteed and direct sold. Kevel Relay allows publishers to “scale [their] ad platform with programmatic demand,” which allows them to “manage all of [their] demand, including direct sold, in one place.”<sup>1401</sup>

#### **4. Equativ**

43) Equativ Ad Server allows publishers to fill a variety of ad space types with a wide variety of ad formats and does not limit customers to only run display ads on the open web as defined by Plaintiffs. Equativ lists banner ads, in-stream video ads, native ads, rewarded video ads that are “displayed at the end of video playback,” and video header ads which “display an out-stream video ad as a header banner,” among other formats.<sup>1402</sup>

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<sup>1400</sup> Internet Archive, “Own your own ad platform,” available at: <https://web.archive.org/web/20240406072249/https://www.kevel.com/ad-server>. Accessed August 6, 2024.

<sup>1401</sup> Internet Archive, “Own your own ad platform,” available at: <https://web.archive.org/web/20240406072249/https://www.kevel.com/ad-server>. Accessed August 6, 2024.

<sup>1402</sup> Thibaud Spagnoli, “Which Format Is Best For Your Campaign?” Equativ, available at: <https://equativ.com/blog/articles/which-format-is-best-for-your-campaign/>. Accessed April 25, 2024.

## APPENDIX IV. FURTHER DISCUSSION OF FORECLOSURE

### A. Public Information Inconsistent with Rivals Lacking Scale

1) Public data also confirm the substantial scale of relationships between publishers and exchanges. Specifically, publishers post “Ads.txt” files on their websites to disclose all exchanges and networks that are authorized sellers of their ad inventory.<sup>1403</sup> Publishers also post “App-ads.txt” files to their websites to identify authorized sellers of their mobile app ad inventory.<sup>1404</sup> Based on publicly available collections of these Ads.txt files (which advertisers utilize to validate that their ad spend has not been wasted on fraudulent publishers), at least eight of Google’s ad tech rivals are listed as authorized sellers for direct or resale ad inventory on more than 300,000 publishers’ ads.txt for web inventory, and all are also listed on more than 75,000 publishers’ app-ads.txt. These rivals include exchanges like Magnite, Pubmatic, OpenX, Xandr, Index Exchange, and Equativ. Overall, there are several hundred ad tech sellers identified by millions of publishers across the web. The magnitude of these relationships suggests not only that the few ad tech entities described in Plaintiffs’ complaint have substantial scale of active relationships with publishers but that the number of these ad tech rivals with substantial scale is an order of magnitude greater than Plaintiffs reveal in their Complaint.

2) Ad tech firms that offer buying tools that compete with Google’s buying tool have vast resources and large scale to compete against Google for advertisers’ business. Examples include:

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<sup>1403</sup> “The mission of the ads.txt project is simple: Increase transparency in the programmatic advertising ecosystem. ads.txt stands for Authorized Digital Sellers and is a simple, flexible and secure method that publishers and distributors can use to publicly declare the companies they authorize to sell their digital inventory.” IAB Tech Lab, “Ads.txt - authorize digital sellers,” January 15, 2024, available at: <https://iabtechlab.com/ads-txt/>.

<sup>1404</sup> For example, see [nytimes.com/app-ads.txt](https://nytimes.com/app-ads.txt) for the New York Times list of authorized sellers of mobile app inventory and see [nytimes.com/ads.txt](https://nytimes.com/ads.txt) for the New York Times list of authorized sellers of web inventory.



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- a. Amazon's total North American revenue in 2023, according to their most recent 10-K, was \$352.828B.<sup>1405</sup> This is an increase of 12%, which was driven "primarily by third-party sellers, advertising sales, and subscription services."<sup>1406</sup> Amazon operates significant business outside the U.S. Its consolidated total revenue was \$574.785B in 2023. Amazon operates a significant non-advertising business, which includes diverse revenue streams such as data services, consumer goods, subscriptions, and video streaming. According to CNBC, Amazon's ad services generated \$11.6B in revenue in the final quarter of 2023, which was an increase of over 19 percent from Q4 2022.<sup>1407</sup>
- b. Microsoft's total revenue was \$211B in 2023.<sup>1408</sup> According to its letter to shareholders following the release of its 2023 financials, Microsoft anticipates future growth of its ad tech business and touts its exclusive publisher partnership with Netflix as "validation of the differentiated value we provide to any publisher looking for a flexible partner to build and innovate with them."<sup>1409</sup>

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<sup>1405</sup> Amazon.com, Inc. Form 10-K, Fiscal Year Ended December 31, 2023, <https://www.sec.gov/ix?doc=/Archives/edgar/data/1018724/000101872424000008/amzn-20231231.htm>, at pp. 24, 68.

<sup>1406</sup> Amazon.com, Inc. Form 10-K, Fiscal Year Ended December 31, 2023, <https://www.sec.gov/ix?doc=/Archives/edgar/data/1018724/000101872424000008/amzn-20231231.htm>, at p. 24.

<sup>1407</sup> Jonathan Vanian, "Amazon's advertising business grew 19%, while Google and Meta both deal with slowdowns," CNBC, February 2, 2023, available at: <https://www.cnbc.com/2023/02/02/amazons-advertising-business-grew-19percent-unlike-google-meta.html>. Amazon benefits from operating various parts together as "[m]argins taken from ad tech allows Amazon to lower prices on products increasing per user purchase behavior creating a virtuous circle." Google notes this success and the strong competition posed by Amazon: "[Amazon c]ompeting effectively could result in Google being forced to compress its margins." (GOOG-AT-MDL-004300215, at -219).

<sup>1408</sup> Satya Nadella, "Annual Report 2023," Microsoft, available at: <https://www.microsoft.com/investor/reports/ar23/index.html>. Accessed March 18, 2024.

<sup>1409</sup> Satya Nadella, "Annual Report 2023," Microsoft, available at: <https://www.microsoft.com/investor/reports/ar23/index.html>. Accessed March 18, 2024. Further, in internal documents, Google recognized AppNexus as its "primary full-stack competition." In 2021, Google also described AppNexus in internal documents as "the largest competitor to the Google Ad Manager web business with roughly ~15%-20% of the web ad serving market and ~25-30% of web ad exchange market." (GOOG-AT-MDL-004300215, at -220).

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- c. Meta's total revenue was \$134.902B according to their most recent 10-K.<sup>1410</sup> Meta operates a Walled Garden through which advertisers can access all its subsidiary platforms, which include Facebook, Instagram, and Messenger.
  - d. The Trade Desk's total revenue in 2023 was \$1.95 billion according to its 2023 investor highlights.<sup>1411</sup> CEO Jeff Green states that "[The Trade Desk] continue[s] to generate significant profitability and cash flow, which allows us to remain at the bleeding edge of our industry."<sup>1412</sup> Its reported revenue in 2023 represented 23 percent annual growth.<sup>1413</sup>
- 3) Ad tech firms that offer exchange services that compete with Google's AdX exchange have vast resources and large scale to compete against Google for advertisers and publishers. Examples include:
- a. Amazon operates an ad exchange called Transparent Ad Marketplace and the Unified Ad Marketplace, in addition to its other ad tech products and a multi-

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<sup>1410</sup> Meta Platforms, Inc. Form 10-K, Fiscal Year Ended December 31, 2023, <https://www.sec.gov/ix?doc=/Archives/edgar/data/1326801/000132680124000012/meta-20231231.htm>, at p. 59. Additionally, in an internal presentation from 2017, Google notes that "Facebook (FB) and Amazon (AMZN) have been winning more mind and market share from [Google's] top partners due to their growing array of publishers solutions." (GOOG-DOJ-13952875, at -876).

<sup>1411</sup> The Trade Desk, "The Trade Desk Reports Fourth Quarter and Fiscal Year 2023 Financial Results," available at: <https://investors.thetradedesk.com/news-events/news-details/2024/The-Trade-Desk-Reports-Fourth-Quarter-and-Fiscal-Year-2023-Financial-Results/default.aspx>. Accessed March 18, 2024.

<sup>1412</sup> The Trade Desk, "The Trade Desk Reports Fourth Quarter and Fiscal Year 2023 Financial Results," available at: <https://investors.thetradedesk.com/news-events/news-details/2024/The-Trade-Desk-Reports-Fourth-Quarter-and-Fiscal-Year-2023-Financial-Results/default.aspx>. Accessed March 18, 2024.

<sup>1413</sup> The Trade Desk, "The Trade Desk Reports Fourth Quarter and Fiscal Year 2023 Financial Results," available at: <https://investors.thetradedesk.com/news-events/news-details/2024/The-Trade-Desk-Reports-Fourth-Quarter-and-Fiscal-Year-2023-Financial-Results/default.aspx>. Accessed March 18, 2024. Additionally, in an internal presentation from 2020 titled "The Trade Desk Competitive Analysis," Google notes that The Trade Desk has experienced "34% year-over-year increase in revenue. Connected TV grew about 100% from Q4 2018 to Q4 2019." (GOOG-DOJ-AT-01570215, at -216). Further, in another internal Google presentation from 2021 titled "The Trade Desk Competitive Overview" Google notes that "[i]n 2020, Google has already lost \$510M to TTD, with another \$1.4B at risk ... Looking ahead, [Google] also estimate[s] that an additional \$3.4 billion is at risk." (GOOG-AT-MDL-009703214, at -216).

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faceted business model with diverse revenue streams. Transparent Ad Marketplace, as with Amazon's full suite of advertising products, is the only way that open web publishers can earn from Amazon demand.<sup>1414</sup> The "advertising unit is still a small fraction of the overall \$149.2 billion it recorded in sales for the fourth quarter," but, following substantial year over year growth, "Amazon now holds 7.3% of the overall online ad market," which includes products beyond display ad formats as defined by Plaintiffs.<sup>1415</sup>

- b. Microsoft operates the Xandr Monetize platform as part of its advertising suite. Xandr Monetize includes both the Xandr Monetize SSP as well as the Xandr Monetize Ad Server as well as Yield Analytics, a product that Plaintiffs exclude from their open web display markets, but is a key part of Microsoft's value proposition for its integrated advertising suite.<sup>1416</sup>
- c. Magnite's revenue in 2023 was \$619.71 million according to its most recent 10-K.<sup>1417</sup> In recent years, Magnite has acquired SpotX<sup>1418</sup> and SpringServe<sup>1419</sup> to expand its CTV ad serving capabilities. Although primarily an omnichannel

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<sup>1414</sup> Amazon Publisher Services, "Transparent Ad Marketplace," available at: <https://aps.amazon.com/aps/transparent-ad-marketplace/>. Accessed March 18, 2024.

<sup>1415</sup> Jonathan Vanian, "Amazon's advertising business grew 19%, while Google and Meta both deal with slowdowns," CNBC, February 2, 2023, available at: <https://www.cnbc.com/2023/02/02/amazons-advertising-business-grew-19percent-unlike-google-meta.html>.

<sup>1416</sup> Microsoft Advertising, "Publisher Platforms," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/publisher-platforms-scaled-buying-selling-solutions>. Accessed March 18, 2024.

<sup>1417</sup> Magnite, Inc. Form 10-K, Fiscal Year Ended December 31, 2023, <https://www.sec.gov/ix?doc=/Archives/edgar/data/1595974/000159597424000014/mgni-20231231.htm>, at p. 46.

<sup>1418</sup> Magnite closed its acquisition of SpotX in 2021. *See* Michael Barrett, "Magnite & SpotX Are Now One Company," Magnite, available at: <https://www.magnite.com/blog/magnite-spotx-are-now-one-company/>. Accessed March 18, 2024.

<sup>1419</sup> Magnite acquired SpringServe for approximately \$31 million in 2021. *See* Magnite, "Magnite Acquires SpringServe, A Leader in CTV Ad Serving Technology," available at: <https://investor.magnite.com/news-releases/news-release-details/magnite-acquires-springserve-leader-ctv-ad-serving-technology>. Accessed March 18, 2024.

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exchange that provides access to narrow display ad formats, Magnite capitalized off the growth potential of the CTV advertising industry and acquired both companies. Moreover, in a recent press release detailing its 2023 earnings, Magnite's CEO Michael G. Barrett praised Magnite's strong financial results despite "muted ad spend environment."<sup>1420</sup> He continues to describe Magnite's expansion, saying, "[Magnite] combined [its] two CTV platforms and launched ClearLine, [Magnite's] direct buying solution...We are expanding [Magnite's] relationships with leading streaming partners as they continue to invest in programmatic, which we believe will drive strong top line growth and profitability for us."<sup>1421</sup>

4) Ad tech firms that offer publisher ad servers that compete with Google's DFP have vast resources and large scale to compete against Google for publishers. Examples include:

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<sup>1420</sup> Magnite, "Magnite reports fourth quarter and full-year 2023 Results," available at: <https://investor.magnite.com/news-releases/news-release-details/magnite-reports-fourth-quarter-and-full-year-2023-results>. Accessed March 17, 2024.

<sup>1421</sup> Magnite, "Magnite reports fourth quarter and full-year 2023 Results," available at: <https://investor.magnite.com/news-releases/news-release-details/magnite-reports-fourth-quarter-and-full-year-2023-results>. Accessed March 17, 2024. Additionally, in an internal strategy review document from, 2021, Google notes that Magnite "continue[s] to be [a] stable player[ ] in the marketplace" and that it "aggressively compete[s] on price while simultaneously leaning into the supply path optimization narrative in the marketplace to support their path to inventory." (GOOG-AT-MDL-004300215, at -221). Google also notes that "[n]ow the two companies [Rubicon and Telaria] have merged into Magnite, their breadth of experience in programmatic and CTV put them in a strong position for growth in 2021." (GOOG-AT-MDL-004300215, at -221).

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- a. Microsoft's Xandr platform includes the Xandr ad server.<sup>1422</sup> Microsoft acquired the Xandr platform from AT&T in 2021.<sup>1423</sup> This acquisition allowed Microsoft to offer a fully integrated ad tech stack.<sup>1424</sup>
- b. Equativ reported 20-percent annual growth in 2023.<sup>1425</sup> As an independent, integrated Exchange and Ad Server, executives note the strong financial performance of Equativ historically, as well as plans for future areas of growth. CRO Parag Vohra calls Equativ "a leading disruptor in adtech," while COO Teiffyon Parry notes that "[Equativ is] seeing very significant growth in our Advanced TV and Curated Marketplace business lines, and I'm extremely excited about our upcoming plans for retail media."<sup>1426</sup>

## **B. Plaintiffs Do Not Offer a Reliable Economic Framework for Scale of Rivals**

5) The somewhat intuitive appeal to the idea that a rival's scale determines competitive outcomes, as Plaintiffs appear to allege, quickly fades as one generalizes to markets that do not look like the stylized market structures described in introductory economics textbooks.

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<sup>1422</sup> Microsoft, "Publisher Platforms," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/publisher-platforms-scaled-buying-selling-solutions>. Accessed March 18, 2024.

<sup>1423</sup> Nicole Farley, "Microsoft, AT&T's Xandr acquisition complete," June 6, 2022, available at: <https://searchengineland.com/microsoft-atts-xandr-acquisition-complete-385631#:~:text=Microsoft%20hopes%20to%20combine%20their,Xandr's%20powerful%20platform%20of%20assets.&text=On%20December%2021%2C%202021%20Microsoft,What%20is%20Xandr>.

<sup>1424</sup> Mikhail Parakhin, "Microsoft to acquire Xandr to accelerate delivery of digital advertising and retail media solutions," Microsoft Advertising Blog, December 21, 2021, available at: [https://about.ads.microsoft.com/en-us/blog/post/december-2021/microsoft-to-acquire-xandr-to-accelerate-its-digital-advertising-and-retail-media-solutions?s\\_cid=en-us-gct-soc-src\\_li-sub\\_ogc-flx\\_heroimage](https://about.ads.microsoft.com/en-us/blog/post/december-2021/microsoft-to-acquire-xandr-to-accelerate-its-digital-advertising-and-retail-media-solutions?s_cid=en-us-gct-soc-src_li-sub_ogc-flx_heroimage). Accessed March 18, 2024.

<sup>1425</sup> Danica Shulz, "Equativ announces executive changes following strong year-on-year revenue growth," Equativ, January 23, 2024, available at: <https://equativ.com/blog/press-release/equativ-announces-executive-changes-following-strong-year-on-year-revenue-growth/>.

<sup>1426</sup> Danica Shulz, "Equativ announces executive changes following strong year-on-year revenue growth," Equativ, January 23, 2024, available at: <https://equativ.com/blog/press-release/equativ-announces-executive-changes-following-strong-year-on-year-revenue-growth/>.

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6) This stylized model is a highly specific case most applicable to classical manufacturing and retail rather than high tech industries. When a high-tech firm develops software, it can produce virtually unlimited amounts of its product at very low marginal cost. Once Google built its system to onboard advertisers and publishers to its products, the additional costs to bringing on each new customer was effectively small (e.g., identifying customer care contacts, allocating server space, etc.) and not necessarily any different from the marginal cost that Google's rivals might face to onboard the same customer.<sup>1427</sup> Therefore, the economic advantages arising from economies of scale in a traditional manufacturing industry do not necessarily translate to the same advantages in ad tech. Plaintiffs' allegations that Google's business practices "deprived rivals of scale," do not mean, as a matter of economics, that the business practices harmed competition.

7) More broadly, competition in an appropriately defined relevant antitrust market does not depend upon evenly distributed market shares or that all competitors exceed some arbitrary share threshold.

"Markets with strong network effects where firms can choose their own technical standards are 'winner-take-most' markets. In these markets there is extreme market share and profits inequality. ... A firm with a large market share has higher sales of complementary goods and therefore its good is more valuable to consumers. ... In the absence of fixed costs, an infinite number of firms can survive, but there is tremendous inequality in market shares, process, and profits among them."<sup>1428</sup>

8) Being small does not necessarily diminish the ability to compete. For example, Hofer, Williams, and Wu observe that, "[i]n contrast, entrants and firms with few existing customers will tend to compete very aggressively and invest in actions that would increase their customer base,

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<sup>1427</sup> In fact, "[e]ase of onboarding & training capabilities" was listed as a "Top Driver of Retention" on Advertiser Perceptions' Demand Side Platforms Report from 1H 2021. (GOOG-DOJ-AT-02524665, at -716).

<sup>1428</sup> Nicholas Economides, "Public Policy in Network Industries" in *Handbook of Antitrust Economics*, ed. Paolo Buccirossi, 2008, at p. 483.

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which would include strategies designed to take sales away from an incumbent firm with a high market share. Accordingly, small competitors are particularly important in markets characterized by switching costs.”<sup>1429</sup> Some small firms engage in competition against much larger rivals through specialization. One such example is described in Sherrill Shaffer’s empirical study on small commercial banks in Illinois, “in which small firms are able to compete by specializing, without monopolistic conduct, despite economies of scale.”<sup>1430</sup> Small firms also engage in competition with larger firms by targeting underserved or overlooked customers. For example, the electric car manufacturer, Tesla, began as a small company aiming to produce high-end electric vehicles “that refused to compromise on mileage or comfort.”<sup>1431</sup> It catered to a subset of customers who were interested in high-tech electric vehicles and could afford the price at over \$100,000. Tesla has since grown significantly and found great success, giving them the ability to expand their production from luxury electric vehicles to more affordable electric vehicles.<sup>1432</sup>

9) The role of a firm’s scale in the ad tech industry is even less likely to have a substantial impact on its ability to compete with larger rivals than the role of scale in other industries. Economic theory indicates that, when all firms in an industry face similarly small and constant marginal costs of production, the efficiencies that arise from a firm’s scale dissipate quickly as a firm covers its fixed costs. Unlike the retail industry where different firms may face very different

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<sup>1429</sup> Paul Hofer, Mark Williams, and Lawrence Wu, “Competition Policy Analysis in Dynamic and Complex Markets: Switching Costs, Aftermarkets, and Network Effects” in *Economics of Antitrust: Complex Issues in a Dynamic Economy*, ed. Lawrence Wu, 2007, pp. 123-136 at p. 128.

<sup>1430</sup> Sherrill Shaffer, “Competition, economies of scale, and diversity of firm sizes,” *Applied Economics*, Vol. 17, 1985, pp. 467-476, at p. 467.

<sup>1431</sup> Q.ai, “Tesla: A History Of Innovation (and Headaches),” Forbes, September 29, 2022, available at: <https://www.forbes.com/sites/qai/2022/09/29/tesla-a-history-of-innovation-and-headaches/>.

<sup>1432</sup> Q.ai, “Tesla: A History Of Innovation (and Headaches),” Forbes, September 29, 2022, available at: <https://www.forbes.com/sites/qai/2022/09/29/tesla-a-history-of-innovation-and-headaches/>.

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marginal costs for the same products, ad tech firms can support growth in the purchase and/or sale of impressions at very low marginal costs that are similar across firms. For example, an Amazon presentation to pitch ad tech firms on using the Amazon Web Services platform for processing real time exchange bidding instead of other computing services, identifies numerous rivals of Google who have achieved nearly the same reductions in computing costs regardless of heterogeneity in the scale of their operations.<sup>1433</sup>

10) Furthermore, larger scale in itself does not imply that a firm will have substantial advantages over its rivals. For example, firms may find that increases to their scale confer little or no additional efficiencies beyond certain increases in size.<sup>1434</sup> The economic term for this effect is diminishing returns to scale. Although Plaintiffs' Complaint alleges that Google derives market power by withholding certain forms of data from its rivals, economic research has found evidence of diminishing returns to scale in relation to collection of data for purposes of making predictions about users' search engine and retail purchase decisions.<sup>1435</sup> As a firm becomes larger, economic theory also indicates that a firm may even experience diseconomies of scale—that is, a firm may grow to a point where further increases to scale reduce its efficiency and, therefore, put it at a

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<sup>1433</sup> “Quantcast Saved 60 percent on its QCLeaRN ML system and 25 percent for RTB using Amazon EC2 Spot Instances; scales up to 1,000 instances every day; ... Smaato [saw] 61 percent cost savings on compute for real-time ad bidding using Amazon EC2 Spot Instances Results from using Auto Scaling and Spot Instances; ... GumGum [saw] 62 percent savings on real-time bidding and ML with Amazon EC2 Spot Instances; ... AppsFlyer Processes 100 billion daily events for fraud detection and prevention, saving 75–80 percent using Amazon EC2 Spot versus On-Demand Instances.” See Gerry Louw and Akhil Aendapally, “Best practices for cloud-based real-time ad platforms,” Amazon Web Services, available at: [https://d1.awsstatic.com/events/reinvent/2021/Best\\_practices\\_for\\_cloudbased\\_realtime\\_ad\\_platforms\\_ADM303.pdf](https://d1.awsstatic.com/events/reinvent/2021/Best_practices_for_cloudbased_realtime_ad_platforms_ADM303.pdf), at p. 16. Accessed March 19, 2024.

<sup>1434</sup> For example, in her deposition, a Google managing director describes that “the way that advertising ecosystem works, the publishers have a varied way by which they can drive dollars to their website. It does not necessarily mean that just because [Google] ha[s] a lot of publishers on GAM, then the value of AdX continues to grow. Again, I wish it was the case; but unfortunately, the publishers have so many different options nowadays, that it’s not a direct correlation.” (Jean (Google) Deposition, 82:13-23).

<sup>1435</sup> Lesley Chiu and Catherine Tucker, “Search Engines and Data Retention: Implications for Privacy and Antitrust,” September 2017, available at [https://www.nber.org/system/files/working\\_papers/w23815/w23815.pdf](https://www.nber.org/system/files/working_papers/w23815/w23815.pdf). Lesley Chiou Patrick Bajarii, Victor Chernozhukov, Ali Hortacsu, and Junichi Suzuki, “The Impact of Big Data on Firm Performance: An Empirical Investigation,” *AEA Papers and Proceedings*, Vol. 109, 2019, pp. 33-37.



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disadvantage relative to rivals of more modest size that may be more nimble or flexible in meeting the challenges of a dynamic industry. For example, Gabriel Andy Szalkowski and Christian Johansen’s research on Netflix’s financial data “suggests the presence of diseconomies of scale” and they “observed a tendency for per-use costs to increase.”<sup>1436</sup> Additionally, R. Dennis Murphy finds that in consumer service industries “consumers cannot rely on the relative size of a firm as a clue to probable performance. On average, larger firms score lower than smaller firms on quality, and do not differ significantly on price.”<sup>1437</sup>

11) Plaintiffs claim that there exist thresholds for sufficient scale to compete.

“Exchanges face the classic “chicken-and-egg” problem. A new entrant must achieve a sufficient scale of both publishers and advertisers using its exchange if it hopes to become viable. Google exploits this chicken-and-egg problem to benefit its own exchange and raise further barriers to entry. By employing a variety of anticompetitive tactics, Google creates barriers for rival exchanges by causing its publisher ad server to preferentially route transactions to Google’s exchange ... and by preferentially routing Google Ads transactions to Google’s exchange.”<sup>1438</sup>

12) However, these claims do not address an economic framework or facts that support scale as an important factor for the ability to constrain monopoly power. A small exchange can specialize to attract customers such as offering a certain type of optimization or providing better algorithms or speed for certain types of ads or content, e.g., specializing in native ads, such as Nativo.

“When choosing a programmatic exchange, what are the most important features that you look for? Are you looking for an exchange that helps you maximize Cost-Per-Action (CPA) or are you more concerned with delivery and scale with the

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<sup>1436</sup> Gabriel Andy Szalkowski and Christian Johansen, “Is Netflix too big? Evidence of diseconomies of scale in subscription-based video on demand services,” *SSRN*, January 6, 2024, available at: <http://dx.doi.org/10.2139/ssrn.4660597>, pp. 1-23, at p. 20.

<sup>1437</sup> R. Dennis Murphy, “Price and Quality Relationships in Local Service Industries,” *FTC Working Paper*, 2002, available at: [https://www.ftc.gov/sites/default/files/documents/reports/price-and-quality-relationships-local-service-industries/wp249\\_0.pdf](https://www.ftc.gov/sites/default/files/documents/reports/price-and-quality-relationships-local-service-industries/wp249_0.pdf), pp. 1-66, at p. 29.

<sup>1438</sup> Fourth Amended Complaint, at ¶160.

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objective of increasing brand awareness or driving sales? Whatever the case, as programmatic buyers you have specific needs and finding the right exchange is vital to campaign success.

So how can you ensure that you are partnering with the right native provider who can meet all of your needs? Nativio is here to help. Nativio's programmatic exchange gives buyers access to the largest scale of native inventory directly from premium publishers with high performing inventory across unique formats."<sup>1439</sup>

13) Likewise, preferentially routing traffic would not necessarily hinder competition by other ad tech firms. To the extent that marginal costs are low and fixed costs are covered, rival ad tech firms can compete against Google on price to steal back volume they allegedly lost to Google.

14) Finally, the economic framework that relates scale to the level of competition in a relevant antitrust market need not abide by Plaintiffs' strictures concerning the boundaries of buying tools, exchanges, and publisher ad servers for open web display ads in the U.S. Below I discuss a number of ways in which rivals in the candidate relevant markets are integrated across a variety of service offerings that make it efficient to continue competing against Google even at a low volume. For example, offering a complementary ad tech service outside the candidate relevant market can generate economic efficiencies with a firm's existing ad server offerings, even if a small number of customers use the ad server.

15) But one need not even account for complementarities outside of Plaintiffs' candidate markets to observe that smaller ad tech firms have ample room to compete even within narrow display ads because Google has made a business decision not to support certain types of open web ads and content. For example, Google's Advertising Policies state that "online pharmaceutical products are not allowed on Ad Exchange. The Ad Exchange pharmaceutical policy includes

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<sup>1439</sup> Nativio, "Programmatic Native Simplified: Nativio's Programmatic Offerings," available at: <https://www.nativio.com/newsroom/programmatic-native-simplified-nativos-programmatic-offerings>. Accessed March 18, 2024.

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prescription drugs, online pharmacies, unapproved pharmaceutical supplements, and other substances, such as steroids.”<sup>1440</sup> Consistent with the predictions of economic theory, despite Google’s business decision not to support online pharmaceutical products on AdX, a large number of rival ad tech businesses specifically point to their capabilities for digital pharmaceutical ads as a value-added proposition for their customers.<sup>1441</sup>

16) Similarly, Google’s Advertising Policies state that “Google assigns a family status to all ads to make sure that ads are shown to an appropriate audience. Products that are considered to have ‘non-family safe’ status cannot currently run on Ad Exchange. In addition, Google restricts the promotion of certain types of non-family safe or adult-oriented content.”<sup>1442</sup> Consistent with economic theory, some ad tech firms scaled up their operations by first developing their business outside the portion of the open web targeted by Google. The company EXOGROUP initially developed its ad server<sup>1443</sup> and exchange technology<sup>1444</sup> to serve publishers of adult content<sup>1445</sup>

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<sup>1440</sup> Google, “Ad Exchange policies and enforcement,” available at: <https://support.google.com/authorizedbuyers/answer/6380359>. Accessed March 19, 2024.

<sup>1441</sup> Pulsepoint, “Transforming Omnichannel Pharma Marketing & Engagement,” available at: <https://pulsepoint.com/blog/transforming-omnichannel-pharma-marketing-engagement>. Accessed March 19, 2024; Viant, “Healthcare programmatic advertising technology,” available at: <https://www.viantinc.com/solutions/industry/healthcare/>. Accessed March 19, 2024; Deepintent, “The most powerful healthcare advertising platform,” available at: <https://www.deepintent.com/platform/>. Accessed August 6, 2024.

<sup>1442</sup> Google, “Ad Exchange policies and enforcement,” available at: <https://support.google.com/authorizedbuyers/answer/6380359>. Accessed August 4, 2024.

<sup>1443</sup> EXADS, “Publisher Ad Server,” available at: <https://www.exads.com/solutions/by-product/publisher-ad-server>. Accessed August 6, 2024.

<sup>1444</sup> Giles Hearst, “ExoClick Launches the Industry’s First Ad Exchange,” ExoClick, August 1, 2017, available at: <https://www.exoclick.com/exoclick-launches-industrys-first-ad-exchange/>.

<sup>1445</sup> “Fueled by the adult industry, ExoClick has become the biggest adtech company in Spain... The Barcelona-based company, founded by Benjamin Fonze in 2006 and now run with his brother Adrien, had revenues of €84 million in 2014 (+30% year-on-year) and continues to dominate in an area where giants like Facebook or Google can’t compete.” Jaime Novoa, “Fueled by the adult industry, ExoClick has become the biggest adtech company in Spain,” Novobrief, May 26, 2015, available at: <https://novobrief.com/exoclick-adtech-spain/2872/>.

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and then expanded or rebranded itself,<sup>1446</sup> using this technological investment and scale of operations, to compete head on with Google and other open web ad tech firms.<sup>1447</sup>

17) Plaintiffs argue that scale is necessary to compete in the ad tech industry as it largely determines the effectiveness of ad tech products. Moreover, Plaintiffs claim that Google's conduct over the relevant time period of alleged harm to competition has purposefully deprived ad tech rivals and potential new entrants of sufficient scale, damaging their ability to compete.<sup>1448</sup> However, the reality is that a vast number of small and large ad tech companies successfully compete to attract publishers and advertiser's businesses. The record demonstrates that even after a small temporary decline in scale that could have harmed rivals by reducing their short-term revenues and profits, ad tech firms, in general, have gained scale over the relevant time period as the outcome of competition on the merits, without materially affecting their ability to compete effectively.

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<sup>1446</sup> "EXOGROUP builds and invests in innovative tech projects, maximizing the synergies between each business enterprise. Currently EXOGROUP consists of the following companies: ExoClick (launched 2006) is an ad network and programmatic ad exchange serving 7+ billion daily ad impressions globally." Jason Malki, "Benjamin Fonze of EXOGROUP: From Avocation To Vocation: How I Turned My Hobby Into A Career," Medium, July 29, 2020, available at: <https://medium.com/authority-magazine/benjamin-fonz%C3%A9-of-exogroup-from-avocation-to-vocation-how-i-turned-my-hobby-into-a-career-155fbec7aa84>.

<sup>1447</sup> Internet Archive, "EXADS," available at: <http://web.archive.org/web/20230315013354/https://www.exads.com/comparisons>. Accessed March 18, 2024.

<sup>1448</sup> Fourth Amended Complaint, at ¶¶401, 418, 508.

## APPENDIX V. GOOGLE AD TECH FORMATS AND ENVIRONMENTS

1) Below is a collection of the types of ads and environments for which they are available to advertisers and publishers who use Google's ad tech.

### A. Banner Ads

2) **Desktop Website:** "Banner ads are simple ads that fit a specific size slot in a webpage or app."<sup>1449</sup>

3) **Apps:** "Banner ad units display rectangular ads that occupy a portion of an app's layout. They stay on screen while users are interacting with the app, either anchored at the top or bottom of the screen or inline with content as the user scrolls. Banner ads can refresh automatically after a certain period of time."<sup>1450</sup>

4) **YouTube:** "A companion banner appears next to your video ad on YouTube. ... Companion banners appear next to the ad on the YouTube watch page. When a viewer clicks on the companion banner, they'll go to a website URL that you provided when creating the campaign."<sup>1451</sup> "Overlay ads are a type of banner ad that hovers at the bottom of the [YouTube] video."<sup>1452</sup>

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<sup>1449</sup> Google Web Designer, "Choose the type of ad you want to create," available at: <https://support.google.com/webdesigner/answer/4418553>. Accessed August 4, 2024.

<sup>1450</sup> Google AdMob Help, "Overview of banner ads," available at: <https://support.google.com/admob/answer/9993556>. Accessed August 4, 2024.

<sup>1451</sup> Google Ads Help, "Create a companion banner for a video ad," available at: <https://support.google.com/google-ads/answer/6293542>. Accessed March 29, 2024.

<sup>1452</sup> HubSpot, "YouTube Ads for Beginners: How to Launch & Optimize a YouTube Video Advertising Campaign," available at: <https://blog.hubspot.com/marketing/youtube-video-advertising-guide>. Accessed August 4, 2024.

5) **Mobile:** “Mobile banner ads are small, rectangular images that advertise products and services. They typically occupy either the top or bottom of a mobile screen. They can be static or animated with rich media.”<sup>1453</sup>

**B. Video Ads**

6) **Desktop Website:** “Video ads on Google video partners can appear on computers, tablets, mobile web browsers, mobile apps, and TV screens. Ads are delivered within a video player ... Google video partners are high-quality publisher websites and mobile apps where you can show your video ads to viewers beyond YouTube.”<sup>1454</sup>

7) **Apps:** “Video ads are ads that display embedded, clickable or tappable video content. They allow users to watch a video embedded in an ad inside of an app before navigating to the relevant app store to install the app being promoted.”<sup>1455</sup>

8) **YouTube:** “[Y]ou can create compelling video campaigns with a range of video ad formats to engage customers in different ways on YouTube and across video partner sites. Available video ad formats include: Skippable in-stream ads; Non-skippable in-stream ads; In-feed video ads; Bumper ads; Outstream ads and Accompanying Content ... Bumper ads are 6 seconds or shorter, and play before, during, or after another video. Viewers don’t have the option

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<sup>1453</sup> Bannerflow, “Mobile Banner Ads: The Ultimate Guide,” available at: <https://www.bannerflow.com/blog/mobile-banner-ads>. Accessed August 4, 2024.

<sup>1454</sup> Google Ads Help, “About Google video partners,” available at: <https://support.google.com/google-ads/answer/7166933>. Accessed August 4, 2024.

<sup>1455</sup> Google AdMob Help, “Video ads,” available at: <https://support.google.com/admob/answer/6375245>. Accessed August 4, 2024.

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to skip the ad. ... Outstream ads begin playing with the sound off. Viewers can tap the ad to unmute the video. Outstream ads are designed to increase your video reach at an efficient cost.”<sup>1456</sup>

9) **Mobile:** “Video ads on Google video partners can appear on computers, tablets, mobile web browsers, mobile apps, and TV screens. Ads are delivered within a video player ... Google video partners are high-quality publisher websites and mobile apps where you can show your video ads to viewers beyond YouTube.”<sup>1457</sup>

**C. Image Ads**

10) **Desktop Website:** “An image ad consists of an image that you provide featuring information about your business, services, or products. When people click anywhere on your ad, they’ll be taken to your website.”<sup>1458</sup>

11) **Apps:** “Image ads are ads that appear with a picture. Use image ads to capture people’s attention as they use your app.”<sup>1459</sup>

12) **YouTube:** “Display image ads do not serve on YouTube.”<sup>1460</sup>

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<sup>1456</sup> Google Ads Help, “About video ad formats,” available at: <https://support.google.com/google-ads/answer/2375464>. Accessed August 4, 2024.

<sup>1457</sup> Google Ads Help, “About Google video partners,” available at: <https://support.google.com/google-ads/answer/7166933>. Accessed August 6, 2024.

<sup>1458</sup> Google Ads Help, “Image ad: Definition,” available at: <https://support.google.com/google-ads/answer/2393023>. Accessed August 4, 2024.

<sup>1459</sup> Google AdMob Help, “Image ads,” available at: <https://support.google.com/admob/answer/6177172>. Accessed August 4, 2024.

<sup>1460</sup> Google Ads Help, “Show your display ad on YouTube,” available at: <https://support.google.com/google-ads/answer/2456100>. Accessed August 4, 2024.

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13) **Mobile:** “Where mobile ads can appear; On mobile phones or tablets: Text ads; Image ads; app promotion ads; HTML 5 ads built with Google Web Designer.”<sup>1461</sup>

**D. In-Feed Video Ads**

14) **YouTube:** “In-feed video ads place your brand, product, or service alongside YouTube content that is likely to be viewed by your target audience. In-feed video ads appear in YouTube search results, YouTube watch next, and the YouTube app Home feed.”<sup>1462</sup>

**E. App Promotion Ads**

15) **Desktop Website:** “Send your customers to download your app from an app store, or include a deep link directly into your app. Reach customers ... on websites and apps that partner with Google.”<sup>1463</sup>

16) **Apps:** “Send your customers to download your app from an app store, or include a deep link directly into your app. Reach customers ... on websites and apps that partner with Google.”<sup>1464</sup>

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<sup>1461</sup> Google Ads Help, “About mobile ads,” available at: <https://support.google.com/google-ads/answer/2472719>. Accessed August 4, 2024.

<sup>1462</sup> Google Ads Help, “In-feed video ads,” available at: <https://support.google.com/google-ads/answer/6227733>. Accessed August 4, 2024.

<sup>1463</sup> Google Ads Help, “About ad formats available in different campaign types,” available at: <https://support.google.com/google-ads/answer/1722124#zippy=%2Capp-promotion-ads>. Accessed August 4, 2024.

<sup>1464</sup> Google Ads Help, “About ad formats available in different campaign types,” available at: <https://support.google.com/google-ads/answer/1722124#zippy=%2Capp-promotion-ads>. Accessed August 4, 2024.



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17) **YouTube:** “For app installs and pre-registration, Google Ads can show your ads on YouTube....Ads can include a video from a YouTube link, text, app icon, app store text, and ratings and appear on the YouTube app.”<sup>1465</sup>

18) **Google Search:** “Send your customers to download your app from an app store, or include a deep link directly into your app. Reach customers when they search on Google...”<sup>1466</sup>

**F. Rewarded Ads**

19) **Apps:** “Rewarded ad units enable users to play games, take surveys, or watch videos to earn in-app rewards, such as coins, extra lives, or points. You can set different rewards for different ad units, and specify the reward values and items users will receive.”<sup>1467</sup>

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<sup>1465</sup> Google Ads Help, “About App campaigns,” available at: <https://support.google.com/google-ads/answer/6247380>. Accessed August 4, 2024.

<sup>1466</sup> Google Ads Help, “About ad formats available in different campaign types,” available at: <https://support.google.com/google-ads/answer/1722124#zippy=%2Capp-promotion-ads>. Accessed August 4, 2024.

<sup>1467</sup> Google AdMob Help, “Create a rewarded ad unit,” available at: <https://support.google.com/admob/answer/7311747>. Accessed August 6, 2024.

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## **APPENDIX VI. METHODOLOGICAL DETAILS FOR MARKET SHARE CALCULATIONS**

1) In this Appendix, I explain my methodology for calculating market shares, including corrections to errors in Professor Gans' calculations. indicates the data fields and criteria I used to filter and group the data in these calculations. Complete details regarding data and methodology are provided in my backup materials.

### **A. Corrections to Professor Gans' Display Ad (Narrow) Market Shares for each Ad Tech Component**

2) In this section I explain how I corrected errors in Professor Gans' estimates of Google's market shares, which are based on his narrow definition of display ads.

#### ***1. Corrected AdX Market Share in Professor Gans' Candidate Exchange Market for Display Ads (Narrow) in the United States***

3) As discussed in the text,<sup>1468</sup> Professor Gans calculates AdX market share as the volume of impressions on AdX divided by the subset of impressions that flow through Google's ad server as indirect sales of ads. However, in my calculations I allow for the possibility that third-party exchanges also have impression transaction volumes on their own exchanges and find that they do. To correct for Professor Gans' underestimation of display ads (narrow) impressions from third-party exchanges, I use their actual display ads (narrow) impressions whenever data are available from third parties.

4) To correctly account for volume of impressions transacted via rival ad exchanges, I first correct an error in Professor Gans' methodology. As explained in the text, review of Professor Gans backup material demonstrates that, when using Header Bidding Monitor data set, Professor

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<sup>1468</sup> See Section VII.C.2 of my report.

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Gans considers an impression as an AdX impression if the column “adx\_buyer\_category” is not equal to “Non-Adx or Unmatched.”<sup>1469</sup> Therefore, Professor Gans incorrectly treats impressions won by rival ad exchanges through Open Bidding auctions as part of Google’s share, since Professor Gans’ definition on an AdX impression in the data includes instances where the column “transaction type” is “EBDA.” To correct for this error, I rely entirely on Professor Gans’ backup material but consider an impression an AdX impression if the column “adx\_buyer\_category” is not equal to “Non-Adx or Unmatched,” and the column “transaction type” is not “EBDA.” Row [B] of Exhibit 20 show the results from this correction.

5) Using the above corrected ad exchange shares, I apply further corrections to fully incorporate data on volume of impressions transacted by third-party exchanges. My review of the record considers as reliable information data from nine third-party exchanges: Index Exchange, Magnite, Microsoft (Xandr Exchange), OpenX, PubMatic, ShareThrough, Sovrn, Yahoo, and Yieldmo.<sup>1470</sup> I utilize Professor Gans’ approach to estimating unobserved volumes from rival exchanges to correct for ad exchange data missing from the denominator of Professor Gans’ market share calculation in his narrow candidate market for ad exchanges. I apply Professor Gans’ approach to computing two scenarios.

6) First, I provide a conservative estimate of Google’s share in Professor Gans’ narrow candidate market. I use Google’s MDL 243 AdX data and MDL 243 DFP Reservations data to compute the share of impression volume accounted for the nine ad exchanges with reliable data transacted through header bidding and Open Bidding with respect to the total volume of

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<sup>1469</sup> Gans Report, at fn. 428.

<sup>1470</sup> See of this Appendix for detailed information on ad exchange third-party data.

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impressions from rival ad exchanges through header bidding and Open Bidding. Next, for the set of nine ad exchanges with reliable data, I calculate the ratio of the impression volume observed in Google's data as header bidding and Open Bidding to the total volume of impression in Professors Gans' narrow candidate ad exchange market observed from data submitted into the record by these nine third-party exchanges. To correct Professor Gans' denominator, I first subtract the estimated (incomplete) volume of impressions for those nine exchanges that submitted data, to avoid potential double counting. I use the share of impression volume for the nine ad exchanges to estimate the (incomplete) volume of impressions accounted for those nine ad exchanges from the non AdX component in Professor Gans' denominator. Then, I add to Professor Gans' denominator the (complete) volume of impressions of these nine ad exchanges, based on their actual data, calculated as their estimated (incomplete) volume of impressions scaled by the ratio of their impression volume observed in Google's data to the impression volume from data submitted into the record.

7) In the second scenario, I correct Professor Gans denominator by also estimating the volume of third-party ad exchanges that did not submit data into the record. I estimate the unobserved impressions transacted by rival exchanges by scaling the non-AdX component in Professor Gans' denominator by the ratio of impression volumes observed in Google's data through header bidding and Open Bidding to the total volume of impressions in Professor Gans' narrow candidate market for the nine ad exchanges that submitted data into the record.

***2. Corrected Google Ads Market Share in Professor Gans' Candidate Market for Small Advertiser Buying Tools to Purchase Display Ads (Narrow) in the United States***

8) Professor Gans purports to calculate Google Ad's market share as "Google Ads' share of impressions among top ad buying tools for small advertisers in AdX" times "AdX share of all

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indirect impressions.”<sup>1471</sup> As discussed in the text,<sup>1472</sup> Professor Gans ignores relevant competitors in the denominator of the first term and includes irrelevant impressions in calculating the numerator of the second term.

9) I correct the first term by including relevant volume of impressions from competitors that Professor Gans ignores as follows:

- I consider all small advertiser buying tools he identifies between 2018 and 2022 but excludes in one or more years. I include the omitted small advertiser buying tools to recalculate the denominator of “Google Ads’ share of impressions among top ad buying tools for small advertisers in AdX.”
- I use data on impressions for small advertising buying tools that he ignores (but that third-party ad buying tools submitted in this matter) to recalculate the denominator of the first term.<sup>1473</sup>

10) The second row of my Exhibit 21 shows the market shares (based on Professor Gans methodology) after making these two corrections.

11) In addition to these corrections, I also correct the numerator of the second term (“AdX share of all indirect impressions”) by removing impressions won by third party exchanges bidding into AdX via Open Bidding. The third row of my Exhibit 21 shows the result after all three corrections.

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<sup>1471</sup> Professor Gans does not explain the assumptions under which this methodology provides a lower bound estimate of Google Ads market share, nor does he provide support for such assumptions. I do not endorse his methodology.

<sup>1472</sup> See Section VII.C.2 of my report.

<sup>1473</sup> Ad buying tools for small advertisers included in Professors Gans Report Table 7 are: Google Ads, Marketgid, Tell Apart, Netmining, ShareThis, Infectious Media IDB, Criteo (JP), Criteo (US), Yahoo - RMX - NA, Yahoo - Display & App (EB), and AppNexus. I accounted for third-party data submitted for Criteo, AppNexus (also known as Microsoft Xandr Invest DSP) and Yahoo.

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**B. Independent Calculations of Market Shares based on eMarketer's Definition of Display Ads**

***1. Google's Market Share in an Ad Buying Tools Markets for Display Ads in the United States***

12) The denominator of my market share calculation is the annual "U.S. Display Ad Spend" reported by eMarketer<sup>1474</sup> for each year.<sup>1475</sup> The numerators for the Google Ads and DV360 components are obtained as follows:

- a. For Google Ads: Based on MDL Google Ads data,<sup>1476</sup> I use the field "gross revenue," after limiting to Display Ads and U.S. advertisers.
- b. For DV360: Based on MDL DV360 XBridge data,<sup>1477</sup> I use the field "gross revenue," after limiting to Display Ads and U.S. advertisers.

13) I report the market share for each year from 2013 to 2022, because this is the time period where full amounts of annual ad spend are available for both numerators and denominators.

***2. Google's AdX Market Share in an Ad Exchange Market for Display Ads in the United States***

14) The denominator of my market share calculation is the annual "U.S. Display Ad Spend" reported by eMarketer for each year.<sup>1478</sup> The numerator is obtained as the sum of three components.

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<sup>1474</sup> For details on eMarketer data, *see* Appendix .D.1.

<sup>1475</sup> The figures summarizing estimates for Google's ad buying tools market share are Figure 85 and Figure 86.

<sup>1476</sup> For details on MDL Google Ads data, *see* Appendix .B.1.

<sup>1477</sup> For details on MDL DV360 XBridge data, *see* Appendix .B.2.

<sup>1478</sup> The figures summarizing estimates for Google's ad buying tools market share are Figure 87 and Figure 88. Figure 89 and Figure 90.

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- a. I use MDL AdX data, after limiting to Display Ads and U.S. publishers which are not test accounts. I limit to AdX by only excluding transaction types equal to “OB—Open Bidding.” I estimate ad spend by scaling gross revenue by a factor of 80/68 as measured by AdX gross revenue field.<sup>1479</sup>
  - b. I use MDL Google Ads and MDL DV360 XBridge data, after limiting Display Ad, U.S. advertisers, and observations that correspond to impressions transacted through inventory source equal to “AdSense” or “AdMob.” Ad spend is measured directly through the gross revenue field.
  - c. I use eMarketer’s estimate of ad spend on YouTube ad inventory.
- 15) Thus, the numerator for Google’s ad exchange market share is the sum of ad spend for display ads from advertisers purchasing inventory on AdX, on AdMob and AdSense from advertisers buying through Google Ads and DV360, and ad spend from direct purchases of YouTube inventory.
- 16) I report the market share for each year from 2014 to 2022, because this is the time period where full amounts of annual ad spend are available for both numerators and denominators.
- 17) I also calculate a variation of Google’s ad exchange market share where the numerator is the sum of ad spend for display ads from purchases on AdX, AdSense, and AdMob, so that

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<sup>1479</sup> AdX gross revenue includes amounts received from Google Ads, DV360, and RTB bidders such as third-party DSPs (*see* Authorized Buyers overview - Authorized Buyers Help (google.com)) after buying tools take their fees. Thus, ad spend associated with AdX gross revenue may be approximated by adding back in the estimated fees that buying tools keep. Google uses the [REDACTED] factor to scale up gross revenue to ad spend for Google Ads impressions purchased through AdX. (*See* GOOG-AT-MDL-C-000012881). While this factor overstates the fees retained by DV360 (*see* Exhibit 2), [REDACTED]. DV360 accounts for a larger share of AdX than RTB bidders (*see* Figure 133 for impressions; note that DV360 also wins at higher average prices than RTB bidders as shown in Figure 145). Thus, using this factor likely overestimates the ad spend associated with AdX gross revenue and, therefore, would tend to overstate Google’s share.

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direct purchases of YouTube and other Google's owned and operated inventory are not included.<sup>1480</sup>

**3. *Google's Market Share in a Multi-Sided Market for Display Ad Transactions in the United States***

18) The denominator of my market share calculation is the annual "U.S. Display Ad Spend" reported by eMarketer. Since the display ad spend reported for Google by eMarketer does not include amounts paid to publishers and only includes Google's net revenue, I leverage Google's reported revenue share across the ad tech stack to estimate total display ad spend on Google's ad tech tools and properties for the numerator. I remove YouTube net revenues prior to performing this estimation, since YouTube is one of Google's owned and operated properties and its revenue is not subject to the same publisher payouts that occur for third-party publishers. Specifically:

- a. I take eMarketer's reported "Google display ad revenues" (which represents Google's net revenue after paying out publishers) and subtract "YouTube ad revenues" (which also represents Google's net revenue on YouTube).
- b. Using Google's reported [REDACTED] revenue share across the ad tech stack,<sup>1481</sup> since the remaining calculation from (a) includes only Google's [REDACTED] revenue share, I divide that figure by 0.32 to estimate total display ad spend on third-party properties.

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<sup>1480</sup> The figures summarizing estimates for Google's ad buying tools market share are Figure 89 and Figure 90.

<sup>1481</sup> See GOOG-DOJ-04004392, at -293.



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- c. Finally, I add YouTube gross revenues back into the total from (b) to generate a full estimate of all display ad spending that goes through Google's ad tech.

## APPENDIX VII. METHODOLOGY NOTES

1) In this section I provide my implementation of relevant concepts across data sources, including data limitations applied to the analyses and exhibits presented in this report. Some of the concepts discussed below cannot be fully defined for all dates in an exhibit due to discontinuities in how fields or values are defined in the data over time.<sup>1482</sup>

### A. Sell Side Data Sources

#### 1. MDL RFP 243 AdX Data

2) The “MDL RFP 243 ADX” data consists of the GOOG-AT-MDL-DATA-000066537 to 482007, GOOG-AT-MDL-DATA-000508827 to 558886 (“Supplement”), and GOOG-AT-MDL-DATA-000561536 to 564882 (“Correction”) files produced in this matter. Data are provided for each month from June 2013 to March 2023. Data from the Supplement are used in place of data from the main submission for July 2022 onwards.<sup>1483</sup> Data from the Correction patch is used after the removal of erroneous data.<sup>1484</sup>

3) Certain concepts defined below make use of the names and billing codes associated with a publisher’s `gfp_network_id` and/or `web_property_id`. These fields are sourced from crosswalks provided for MDL RFP 243 AdX Submission (GOOG-AT-MDL-DATA-000558883, GOOG-AT-MDL-DATA-000558886).

#### a) Ads Viewed by U.S. Users

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<sup>1482</sup> For those exhibits, where periods and concepts cannot be fully defined, they may be denoted with a dotted line (in the case of line charts) or a textured fill (in the case of area charts).

<sup>1483</sup> For additional details, see May 30, 2023 letter from D. Pearl to M. Mao and W. Noss at RFP 243 (Google Digital Advertising Antitrust Litigation, No. 1:21-md-03010 (PKC)); and (GOOG-AT-MDL-C-000012758).

<sup>1484</sup> All records where “`ad_source_type`” is 2 or 4, and “`cost_type`” is 1 are dropped for the months between December 2019 and June 2022. For all months between July 2022 and November 2022, all records where “`ad_source_type`” is 2 or 4, “`cost_type`” is 1, and “`is_adx_direct`” is False. See, GOOG-AT-MDL-C-000012928.

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- 4) Where possible, geography is defined according to the location of users viewing ads.

In such analyses, data are limited to records where country\_criteria\_id is “2840.”<sup>1485</sup>

*b) U.S. Publishers*

- 5) Where a user-based definition is not possible or is not applicable geography is instead defined in terms of publishers’ location. Publishers are defined by their “gfp\_network\_id.” A publisher is defined to be a U.S. publisher if:

- a. The corresponding “gfp\_network\_country\_billing\_code” or “web\_property\_country\_billing\_code” is “US,” or
- b. if any one of those fields take value-code “US” in: MDL RFP 243 DFP Reservations, MDL RFP 243 AdSense Backfill Data, or DOJ RFP 57 DFP Fees data.

*c) Test Account Publishers*

- 6) Certain publishers have names indicating that they represent test accounts and not legitimate transactions aimed at showing ads to users. Such publishers are excluded from analysis unless otherwise noted. For more details on how these accounts are defined please see my backup materials.

*d) Display Ads (Narrow)*

- 7) Section V of my report defines my interpretation of Professor Gans’ candidate markets, or also referred to as “Display Ads (Narrow)” in some analyses in my report. These analyses follow Professor Gans’ narrow definition of display ads in his discussion of exchange

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<sup>1485</sup> See; GOOG-AT-MDL-DATA-000482001, country\_criteria\_id equal to “2840” refers to user\_country\_code=“US.”

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markets. For the implementation of “Display Ads (Narrow)” in the case of MDL RFP 243 AdX data, I limited to records where:

- a. creative\_ad\_format is “DynamicImage,” “Flash,” “Html,” “Image” or “Text,” (Excludes “Video,” “Audio”),
- b. inventory\_type is “Desktop,” “TabletWeb” or “mWeb,” (Excludes “mApp,” “CTV,” “Other”).
- c. transaction\_type\_name is “FL - First Look,” “HB - Header Bidding,” “OA - Open Auction,” “OB - Open Bidding,” “OB - Open Bidding - Authorized Buyer,” “OB - Open Bidding - Buyer-Based Revshare,” “OB - Open Bidding - Buyer-Based Revshare - Direct Payment” or “OB - Open Bidding - Network Bidding.” (Excludes: “Other,” “MP - Marketplace Package,” “PD - Preferred Deal,” “PG - Prog. Guaranteed,” “PA - Private Auction,” “PNG - Deprecated (png),” “SP - Sponsored Product”).

*e) Display Ads (Narrow) Plus Direct Deals*

8) Some analyses are denoted as being limited to “Display Ads (Narrow) Plus Direct Deals.” These analyses follow the narrow definition of display ads pursued by Professor Gans but omit the requirement that ads be transacted indirectly (that is, transaction\_type\_name can take any value). In the case of MDL RFP 243 AdX data, such analyses a limited to records where:

- a. creative\_ad\_format is “DynamicImage,” “Flash,” “Html,” “Image” or “Text,” (Excludes “Video,” “Audio”),

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- b. inventory\_type is “Desktop,” “TabletWeb” or “mWeb” (Excludes “mApp,” “CTV,” “Other”).

*f) Display Ads*

9) Some analyses are denoted as being limited to “Display Ads.” These analyses follow a broader definition of display ads as provided in this report in Section V. In the case of MDL RFP 243 AdX data, such analyses are limited to records where:

- a. creative\_ad\_format is “Video,” “DynamicImage,” “Flash,” “Html,” “Image,” or “Text.” (Excludes: “Audio”)

*g) Usage of AdX Direct Tags*

10) AdX Direct tags allow publishers to access Google’s ad exchange without needing to also use its ad server. Records associated with AdX Direct transactions are identified when the “is\_adx\_direct” field equals “True,” or when the publisher’s “gfp\_network\_id” is “-1.” A publisher is considered to be using AdX Direct if it has at least once such transaction during the time period available in the data.

*h) Open Bidding Transactions*

11) Open Bidding transactions are identified where the transaction\_type\_name field takes any of the “OB – Open Bidding” values. Data from Open Bidding transactions are observed for the first time in February 2016 until March 2023.

*i) Network Bidding Transactions*

12) Network Bidding transactions are identified where the transaction\_type\_name is “OB - Open Bidding - Network Bidding.”

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*j) Publisher Revenue per Thousand Impressions*

13) Publisher revenue per thousand impressions is calculated by multiplying “pub\_net\_rev\_usd” by 1,000 and then dividing by total impressions.

*k) Cost per Thousand Impressions*

14) Cost per thousand impressions is calculated by multiplying “gross\_rev\_usd” by 1,000 and then dividing by total impressions.

*l) Cost per Click*

15) Cost per click is calculated as “gross\_rev\_usd” divided by “clicks.”

*m) AdX Revenue Share*

16) Google’s AdX revenue share is calculated as “adx\_net\_rev\_usd” divided by “gross\_rev\_usd.”

**2. MDL RFP 243 DFP Reservations Data**

17) The “MDL RFP 243 DFP Reservations” data consist of the mdl\_rfp\_243\_dfp\_reservations\_submission (GOOG-AT-MDL-DATA-000482008 to 531) files produced in this matter. Data are provided from January 2014 to December 2022.<sup>1486</sup>

*a) Ads Viewed by U.S. Users*

18) Where possible, geography is defined according to the location of users viewing ads. In such analyses, data are limited to records where country\_criteria\_id is “2840.”

*b) U.S Publishers*

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<sup>1486</sup> For additional details, see May, 30, 2023 letter from [REDACTED], at RFP 243 (Google Digital Advertising Antitrust Litigation, No. 1:21-md-03010 (PKC)).

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19) Where a user-based definition is not possible or is not applicable, geography is instead defined in terms of publishers' location. Publishers are defined by their "gfp\_network\_id." A publisher is defined to be a U.S. publisher if:

- i. The corresponding "gfp\_network\_country\_billing\_code" or "web\_property\_country\_billing\_code" is "US," or
- ii. if any one of those fields take value-code "US" in: MDL RFP 243 AdX, MDL RFP 243 AdSense Backfill Data, or DOJ RFP 57 DFP Fees data.

*c) Test Account Publishers*

20) Certain publishers have names indicating that they represent test accounts and not legitimate transactions aimed at showing ads to users. Such publishers are excluded from analysis unless otherwise noted. For more details on how these accounts are defined please see my backup materials.

*d) Display Ads (Narrow)*

21) Section V of my report defines my interpretation of Professor Gans' candidate markets, or also referred to as "Display Ads (Narrow)" in some analyses in my report. These analyses follow Professor Gans' narrow definition of display ads in his discussion of exchange markets. For the implementation of "Display Ads (Narrow)" in the case of DFP Reservations data, such analyses are limited to records where:

- i. creative\_ad\_format is "DynamicImage," "Flash," "Html," "Image," or "Text," (Excludes "Video" and "Audio"),
- ii. is\_mobile\_app\_request is "False," or blank values,

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iii. user\_device is “Desktop,” “MobileWeb,” “TabletWeb,” “Unknown,”  
(Excludes “MobileApp,” “TabletApp,” “Other,” “GameConsole,”  
“SetTopBox,” “TV”),

iv. reservation\_name is “Network,” “Bulk,” or, “PricePriority,” (Excludes  
“Sponsorship,” “Standard,” “House,” “Bumper”).

*e) Display Ads (Narrow) Plus Direct Deals*

22) Some analyses are denoted as being limited to “Display Ads (Narrow) Plus Direct Deals.” These analyses follow the narrow definition of display ads pursued by Professor Gans but omit the requirement that ads be transacted indirectly. In the case of DFP Reservations data, such analyses are limited to records where:

- i. creative\_ad\_format is “DynamicImage,” “Flash,” “Html,” “Image,” or  
“Text,” (Excludes “Video,” “Audio”),
- ii. is\_mobile\_app\_request is “False,” or blank values, (Excludes  
“MobileApp,” “TabletApp,” “Other,” “GameConsole,” “SetTopBox,”  
“TV”),
- iii. user\_device is “Desktop,” “MobileWeb,” “TabletWeb,” “Unknown,”  
(Excludes “MobileApp,” “TabletApp,” “Other,” “GameConsole,”  
“SetTopBox,” “TV”).

*f) Display Ads*



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23) Some analyses are denoted as being limited to “Display Ads.” These analyses follow a broader definition of display ads as provided in this report in Section V. In the case of DFP Reservations data, such analyses are limited to records where:

iv. `creative_ad_format` is “Video,” “DynamicImage,” “Flash,” “Html,” “Image,” or “Text.” (Excludes “Audio”).

*g) Header Bidding Transactions*

24) Header Bidding transactions are identified in DFP Reservations data as records where the `HB_Exchange` field takes a non-blank value other than “No HB.” Data from header bidding transactions are observed for the first time in June 2018 until March 2023.

**3. DOJ RFP 57 DFP Fees Data**

25) The “DOJ RFP 57 DFP Fees” data consist of the files “DOJ-MDL Ad Tech RFPs - Expert Datasets - DFP Fees - fbi.dfp.xpp - Stacked - 2023-09-06” (GOOG-AT-DOJ-DATA-000247050), “DOJ-MDL Ad Tech RFPs - Expert Datasets - DFP Fees - Monthly\_Fee2 - 2023-09-06” (GOOG-AT-DOJ-DATA-000247051), “DOJ-MDL Ad Tech RFPs - Expert Datasets - DFP Fees - Serving\_Fee2 - 2023-09-06” (GOOG-AT-DOJ-DATA-000247052), and “DOJ-MDL Ad Tech RFPs - Expert Datasets - DFP Fees - Uplift\_Fee2 - 2023-09-06” (GOOG-AT-DOJ-DATA-000247053) produced in this matter. Data are provided for each month from January 2014 to June 2023.<sup>1487</sup>

*a) U.S. Publishers*

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<sup>1487</sup> For additional detail, see GOOG-AT-MDL-C-000012795.

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26) Where a user-based definition is not possible or is not applicable geography is instead defined in terms of publishers' location. Publishers are defined by their gfp\_network\_id and are considered to be in the United States if:

- a. The corresponding pub\_billing\_country\_code is "US," or
- b. if it is "US" in MDL RFP 243 AdX, MDL RFP 243 DFP Reservations, or MDL RFP 243 AdSense Backfill Data.

*b) Variable Ad Serving Fees*

27) Variable ad serving fees include all fees charged on a per impression basis. They exclude fixed fees, such as setup fees, minimum fees, monthly fees, and data transfer fees.

*c) Total Ad Serving Fees*

28) Total ad serving fees include both variables fees which are charged on a per impression basis and fixed fees, such as setup fees, minimum fees, monthly fees, and data transfer fees.

*d) Invoiced Impressions*

29) Invoiced impressions are all impressions that a publisher is billed for.

*e) Total Impressions*

30) Total impressions are the sum of invoiced and non-invoiced impressions.

*f) Variable Ad Serving Fees per Thousand Invoiced Impressions*

31) Variable ad serving fees per thousand invoiced impressions is calculated as variable fees divided by invoiced impressions multiplied by 1,000.

*g) Total Ad Serving Fees per Thousand Impressions*

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32) Total ad severing fees per thousand impressions is calculated as total fees divided by total impressions multiplied by 1,000.

**4. MDL RFP 243 AdSense Backfill Data**

33) The “MDL AdSense Backfill” data consists of the GOOG-AT-MDL-DATA-000482532 to GOOG-AT-MDL-DATA-000486515 files produced in this matter. Data are provided from January 2015 to December 2022.<sup>1488</sup>

*a) Ads Viewed by U.S. Users*

34) Where possible, geography is defined according to the location of users viewing ads. In such analyses, data are limited to records where country\_criteria\_id is “2840.”

*b) U.S Publishers*

35) Where a user-based definition is not possible or is not applicable geography is instead defined in terms of publishers’ location. Publishers are defined by their “gfp\_network\_id.” A publisher is defined to be a U.S. publisher if:

- i. The corresponding “gfp\_network\_country\_billing\_code” or “web\_property\_country\_billing\_code” is “US,” or,
- ii. if any one of those fields take value-code “US” in: MDL RFP 243 AdX, MDL RFP 243 DFP Reservations, or DOJ RFP 57 DFP Fees data.

*c) Test Account Publishers*

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<sup>1488</sup> For additional details, see May 30, 2023 letter from [REDACTED], at RFP 243 (Google Digital Advertising Antitrust Litigation, No. 1:21-md-03010 (PKC)).

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36) Certain publishers have names indicating that they represent test accounts and not legitimate transactions aimed at showing ads to users. Publishers are excluded from analysis unless otherwise noted. For more details on how these accounts are defined please see my backup materials.

*d) Display Ads (Narrow)*

37) Section V of my report defines my interpretation of Professor Gans' candidate markets, or also referred to as "Display Ads (Narrow)" in some analyses in my report. These analyses follow Professor Gans' narrow definition of display ads in his discussion of exchange markets. For the implementation of "Display Ads (Narrow)" in the case of MDL RFP 243 AdSense Backfill Data, I limited to records where:

- iii. creative\_ad\_format is "DynamicImage," "Flash," "Html," "Text," or "Unknown," (Excludes: "Video," "Audio," "Invalid"),
- iv. is\_mobile\_app\_request is "False," or missing,
- v. user\_device is "Desktop," "MobileWeb," "TabletWeb," "Unknown," (Excludes "MobileApp," "TabletApp," "TV"),
- vi. transaction\_type\_name is "OA – Open Auction," "-1: Other," or is missing. (Excludes "PG - Prog. Guaranteed"<sup>1489</sup>).

*e) Display Ads (Narrow) Plus Direct Deals*

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<sup>1489</sup> There is only one PG transaction, accounting for one impression worth less than a penny in AdSense Backfill data.

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38) Some analyses are denoted as being limited to “Display Ads (Narrow) Plus Direct Deals.” These analyses follow the narrow definition of display ads pursued by Professor Gans but omit the requirement that ads be transacted indirectly. In the case MDL RFP 243 AdSense Backfill Data, such analyses are limited to records where:

vii. creative\_ad\_format is “DynamicImage,” “Flash,” “Html,” “Text,” or “Unknown,” (Excludes: “Video,” “Audio,” “Invalid”),

viii. is\_mobile\_app\_request is “False,” or missing,

ix. user\_device is “Desktop,” “MobileWeb,” “TabletWeb,” “Unknown.” (Excludes “MobileApp,” “TabletApp,” “TV”).

*f) Display Ads*

39) Some analyses are denoted as being limited to “Display Ads.” These analyses follow a broader definition of display ads, as I embrace in Section V of this report. In the case of MDL RFP 243 AdSense Backfill Data, such analyses are limited to records where:

x. creative\_ad\_format is “Video,” “DynamicImage,” “Flash,” “Html,” “Image,” “Text,” or “Unknown.” (Excludes: “Audio,” “Invalid”).

*g) Publisher Revenue per Thousand Impressions*

40) Publisher revenue per thousand impressions is calculated by multiplying pub\_net\_rev\_usd by 1,000 and then dividing by total impressions.

*h) Cost per Thousand Impressions*

41) Cost per thousand impressions is calculated by multiplying gross\_rev\_usd by 1,000 and then dividing by total impressions.

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*i) Cost per Click*

42) Cost per click is calculated as gross\_rev\_usd divided by clicks.

**5. DOJ RFP 57 DRX Internal Stats**

43) The “DOJ RFP 57 DRX Internal Stats” data consist of GOOG-AT-DOJ-DATA-000066799 to GOOG-AT-DOJ-DATA-000245943 files produced in this matter. Data are provided for the period from August 2015 to June 2023.<sup>1490</sup>

*a) U.S Publishers*

44) Where a user-based definition is not possible or is not applicable geography is instead defined in terms of publishers’ location. Publishers are defined by their “gfp\_network\_id.” A publisher is defined to be a U.S. publisher if the corresponding “gfp\_country” equal “US.”

*b) Test Account Publishers*

45) Certain publishers have names indicating that they represent test accounts and not legitimate transactions aimed at showing ads to users. Such publishers are excluded from analysis unless otherwise noted. For more details on how these accounts are defined please see my backup materials.

*c) Display Ads (Narrow)*

46) Section V of my report defines my interpretation of Professor Gans’ candidate markets, or also referred to as “Display Ads (Narrow)” in some analyses in my report. These analyses follow Professor Gans’ narrow definition of display ads in his discussion of exchange

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<sup>1490</sup> For additional details, see GOOG-AT-MDL-C-000012795.

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markets. For the implementation of “Display Ads (Narrow)” in the case of DRX Internal Stats, such analyses are limited to records where:

- c. creative\_type\_id\_name excludes “Video,” “Instream,” “Trueview”,
- d. is\_mobile\_app\_request is “False,” or blank values; is\_video\_inventory is “False”; and is\_youtube\_inventory is “False”,
- e. platform\_type is 1 through 5: “Unknown,” “Desktop,” “Mobile,” “Tablet,” “TV” (Excludes 6 through 8: “GameConsole,” “SetTopBox,” “CTV”),
- f. transaction\_type\_name is “DFL - First Look deals,” “HB - Header Bidding,” “OA - Open Auction,” “OB - Open Bidding,” (Excludes “AdX not able to fill,” “MP - Marketplace Package,” “PD - Preferred Deal,” “PG - Prog. Guaranteed,” “PA - Private Auction,” “PNG - Deprecated (png),” “NB – Network Bidding,” “SP - Sponsored Product”).

**6. DOJ RFP 50/59 GAM Bid Level Data**

47) The “DOJ RFP 50/59 GAM Bid Level” data consists of the doj\_rfp\_50\_59\_gam (GOOG-AT-EDVA-DATA-000147607 to 226014) files produced in this matter. Data are limited to the 35<sup>th</sup>, 36<sup>th</sup>, 37<sup>th</sup>, 38<sup>th</sup>, and 39<sup>th</sup>, second of every minute of the month of June 2023 for all days except June 28, and to all queries received during all seconds on June 28, 2023. Price floors are defined as distinct positive values of bid\_floor\_usd observed for each publisher.<sup>1491</sup>

**7. MDL XPP Monthly Current Stats Data**

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<sup>1491</sup> For additional details, see GOOG-AT-MDL-C-000012786.

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48) The “MDL XPP Monthly Current Stats” data consists of the GOOG-AT-MDL-DATA-000561031 to GOOG-AT-MDL-DATA-000561262 files produced in this matter. Data are provided from January 2007 to March 2023.<sup>1492</sup>

**B. Buy Side Data Sources**

***1. MDL RFP 243 Google Ads Data***

49) The “MDL RFP 243 Google Ads” data consists of the mdl\_rfp\_243\_google\_ads\_submission (GOOG-AT-MDL-DATA-000486626 to 8277) files produced in this matter.<sup>1493</sup> Data are provided for the period from January, 2014 to December, 2022.

*a) U.S. Advertisers*

50) Where a user-based definition is not possible or is not applicable geography is instead defined in terms of the location of advertisers. Advertisers are considered to be in the United States if their billing\_country\_code is “US.”

*b) Display Ads (Narrow)*

51) Section V of my report defines my interpretation of Professor Gans’ candidate markets, or also referred to as “Display Ads (Narrow)” in some analyses in my report. These analyses follow the narrow definition of display ads pursued by Professor Gans in his discussion of ad exchange and ad buying tools markets. For the implementation of “Display Ads (Narrow)” in the case of MDL Google Ads data I limit to records where:

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<sup>1492</sup> For additional details, see GOOG-AT-MDL-C-000012758.

<sup>1493</sup> For additional details, see May 30, 2023 letter from D. Pearl to M. Mao and W. Noss, at RFP 243 (Google Digital Advertising Antitrust Litigation, No. 1:21-md-03010 (PKC)).



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- a. ad\_format is “Display,” (Excludes “Video”),
- g. environment is “Web,” (Excludes “App,” “Unknown”),
- h. inventory source is “3PE,” “AdExchange,” “AdSense,” or “Demand Product,” (Excludes “Google Properties,” “YouTube,” “Unknown”),
- i. product\_area is “DVA,” (Excludes “YouTube”),
- j. front\_end is “AdWords,” (Excludes “BART,” “Famebit”),
- k. transaction\_type is “Open Auction.” (Excludes “Programmatic Guarantee,” “Famebit,” “Reservation,” “YouTube GP”).

*c) Display Ads (Narrow) Plus Direct Deals*

52) Some analyses are denoted as being limited to “Display Ads (Narrow) Plus Direct Deals.” These analyses follow the narrow definition of display ads pursued by Professor Gans but omit the requirement that ads be transacted indirectly. In the case MDL Google Ads data, such analyses are limited to records where:

- l. ad\_format is “Display,” (Excludes “Video”),
- m. environment is “Web,” (Excludes “App,” “Unknown”),
- n. inventory source is “3PE,” “AdExchange,” “AdSense,” or “Demand Product,” (Excludes “Google Properties,” “YouTube,” “Unknown”),
- o. product\_area is “DVA,” (Excludes “YouTube”),
- p. front\_end is “AdWords,” (Excludes “BART,” “Famebit”).

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*d) Display Ads*

53) Some analyses are denoted as being limited to “Display Ads.” These analyses follow a broader definition of display ads, as I embrace in Section V of this report. In the case of MDL Google Ads data, such analyses are limited to records where:

q. `ad_format` is “Display,” or “Video.”

*e) Cost per Thousand Impressions (CPM)*

54) Cost per thousand impressions is calculated as `total_revenue_usd` divided by total impressions multiplied by 1,000.

*f) Cost per Click (CPC)*

55) Cost per click is calculated by dividing `revenue_usd` by clicks.

*g) Paying on CPM-Basis*

56) Advertisers may choose to pay for ads on a cost per thousand impressions (CPM) basis. Such transactions are defined by the `cost_model` field being “CPM.”

*h) Paying on a CPC-Basis*

57) Advertisers may choose to pay for ads on a Cost per Click (or CPC) basis. They may opt to do so either on a true CPC-basis or on a CPC-to-CPM basis, where they are charged the CPM equivalent price when ads are clicked. Both models represent advertisers paying per click, therefore transactions on a CPC-basis are defined by the `cost_model` field being either “CPC” or “CPC to CPM.”

*i) Google Ads Revenue Share*

58) The Google Ads revenue share is calculated as `net_revenue_usd` divided by `revenue_usd`.

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**2. MDL DV360 XBridge Data**

59) The “MDL DV360 XBridge” data consists of the mdl\_dv360\_xbridge\_submission (GOOG-AT-MDL-DATA-000561263 to 420) files produced in this matter. Data are provided for the period from January 2012 to March 2023.

*a) U.S. Advertisers*

60) Where a user-based definition is not possible or is not applicable geography is instead defined in terms of the location of advertisers. Advertisers are considered to be in the United States if their billing\_country\_code is “US.”

*b) Display Ads (Narrow)*

61) Section V of my report defines my interpretation of Professor Gans’ candidate markets, or also referred to as “Display Ads (Narrow)” in some analyses in my report. These analyses follow the narrow definition of display ads pursued by Professor Gans in his discussion of ad exchange and ad buying tools markets. For the implementation of “Display Ads (Narrow)” in the case of XBridge DV360 data, such analyses are limited to records where:

- i. ad\_format is “Display,”
- ii. environment is “Desktop,” “Mobile Web,” “Web,” or “Unknown,”
- iii. inventory source is “3PE,” “AdExchange,” “AdSense,” or “Demand Product,”
- iv. product\_area is “DVA,”
- v. transaction\_type is “Open Auction,” or “Unknown.”

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*c) Display Ads (Narrow) Plus Direct Deals*

62) Some analyses are denoted as being limited to “Display Ads (Narrow) Plus Direct Deals.” These analyses follow the narrow definition of display ads pursued by Professor Gans but omit the requirement that ads be transacted indirectly. In the case XBridge DV360 data, such analyses are limited to records where:

- i. ad\_format is “Display,”
- ii. environment is “Desktop,” “Mobile Web,” “Web,” or “Unknown,”
- iii. inventory source is “3PE,” “AdExchange,” “AdSense,” or “Demand Product,” and
- iv. product\_area is “DVA.”

*d) Display Ads*

63) Some analyses are denoted as being limited to “Display Ads.” These analyses follow a broader definition of display ads, as I embrace in Section V of this report. In the case of XBridge DV360 data, such analyses are limited to records where:

- v. ad\_format is “Display,” or “Video.”

**3. DOJ RFP 57 Autobidding Data**

64) The “DOJ RFP 57 Autobidding data” consists of the doj\_rfp\_57\_autobidding\_conversions (GOOG-AT-DOJ-DATA-000010657 to 1656), and

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doj\_rfp\_57\_autobidding\_revenue (GOOG-AT-DOJ-DATA-000011657 to 2656) files produced in this matter.<sup>1494</sup> These data have not been limited prior to analysis.

*a) Click-Through Rate (CTR)*

65) Click-through rate is calculated as the total number of clicks divided by the total number of impressions.

*b) Cost per Click (CPC)*

66) Cost per click is calculated as total ad spend divided by total clicks.

*c) Conversions per Dollar Spent*

67) Conversions per Dollar Spent are calculated as the total number of conversions divided by total ad spend.

**4. DOJ RFP 57 Corrected Bidder Behavior Data**

68) The “DOJ RFP 57 Corrected Bidder Behavior” data consists of the file `doj_rfp_57_bidder_behavior_corrected` (GOOG-AT-DOJ-DATA-000248356) produced in this matter. Data have not been filtered or restricted in any way.<sup>1495</sup>

**5. DOJ RFP 57 Campaign Manager Data**

69) The “DOJ RFP 57 Campaign Manager Data” data consists of the file `doj_rfp_57_campaign_manager` (GOOG-AT-DOJ-DATA-000247045) produced in this matter. Data have not been filtered or restricted in any way.<sup>1496</sup> Data provides information on select advertisers including some Federal Agency Advertisers. The data reflects information for

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<sup>1494</sup> For additional detail, see GOOG-AT-MDL-C-000012795.

<sup>1495</sup> For additional detail, see GOOG-AT-MDL-C-000012795.

<sup>1496</sup> For additional detail, see GOOG-AT-MDL-C-000012795

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advertisers and their respective campaigns by categories such as media format, environment, and pricing type, as would be visible in the CM360 user interface.

*a) Ads Viewed by U.S. Users*

70) Where possible, geography is defined according to the location of users viewing ads.

In such analyses, data are limited to records where user\_country is “United States.”

*b) Test Account Advertisers*

71) Certain advertisers have names indicating that they represent test accounts and not legitimate transactions aimed at showing ads to users. Such advertisers are excluded from analysis unless otherwise noted.

**6. MDL XP Daily Current Stats Data**

72) The “MDL XP Daily Current Stats Data” data consists of the files produced as mdl\_xp\_daily\_current\_stats\_submission (GOOG-AT-MDL-DATA-000558890 to 9276) produced in this matter.<sup>1497</sup>

*a) Display Ads (Narrow)*

73) For the implementation of “Display Ads (Narrow)” in MDL XP Daily Current Stats data, I limit to records where:

- i. ad\_format is "Display" (Excludes: “Video,” “Audio”),
- ii. product\_area is “DVA.” (Excludes: “YouTube”),

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<sup>1497</sup> For additional details, see GOOG-AT-MDL-C-000012758. SSS

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#: 38632

iii. environment is “Desktop,” “Mobile Web,” or “Web.” (Excludes: “App,” “Unknown”),

- iv. transaction\_type is “Open Auction.”

*b) U.S. Advertisers*

74) Advertisers are considered to be in the United States if their billing\_country\_code is “US.”

## 7. DOJ RFP 57 Share of Wallet Data

75) The “DOJ RFP 57 Share of Wallet” data consist of “doj\_rfp\_57\_sow” (GOOG-AT-DOJ-DATA-000247054 to 8353) files produced in this matter.

a) *Display Ads (Narrow)*

76) For the implementation of “Display Ads (Narrow)” in DOJ RFP 57 Share of Wallet data, I attribute spending captured in “external\_adspend\_usd\_int\_dis” to Display Ads (Narrow).

*b) U.S. Advertisers*

77) U.S. Advertisers are identified where service\_country\_code is "US."

### C. Third-Party Data

***1.***

*1.*

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101) The “DOJ RFP 57 eMarketer” data consists of the “us-ad-spending-2023” (GOOG-AT-DOJ-DATA-000066787) file produced in this matter.

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102) Data are estimates from eMarketer based on its analysis of reported revenues from major ad publishers, historic ad market trends, estimates of other research firms, broad consumer trends of the use/consumption of different media or devices in relation to one-another, macroeconomic trends, and interviews with market analysts and participants. Prior to 2017, in-stream video ad spending was not measured in these estimates, and spending on connected TV devices was included with spending on desktop devices. Mobile ad spending includes spending on tablet devices.

## 2. *Ad Server Competitors*

103) In addition to third-party produced data, information on ad servers was compiled from publicly available sources.<sup>1498</sup>

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<sup>1498</sup> Equativ, “SSP Marketplace,” available at: <https://equativ.com/solutions/earn/ssp/>. Accessed July 24, 2024; Equativ, “Smart AdServer Rebrands as Equativ,” available at: <https://equativ.com/blog/press-release/smart-adserver-rebrands-as-equativ/>. Accessed July 24, 2024; Kevel, “The power of API ad serving in your hands,” available at: <https://www.kevel.com/ad-server>. Accessed July 24, 2024; Magnite, “Sellers,” available at: <https://www.magnite.com/sellers/>. Accessed July 24, 2024; Smaato, “We Give You the Controls. You Create the Experience,” available at: <https://www.smaato.com/publishers/>. Accessed July 24, 2024; Verve, “Verve acquires Smaato, securing a spot as a top-10 global exchange,” available at: <https://verve.com/press/verve-group-acquires-smaato/>. Accessed July 24, 2024; Broadstreet, “We help small publisher impress, perform, and renew,” available at: <https://broadstreetads.com/>. Accessed July 24, 2024; ExAds, “Alternative to Broadstreet Ad Server,” available at: <https://www.exads.com/blog/alternative-to-broadstreet-ad-server>. Accessed July 24, 2024; Microsoft Advertising, “Microsoft Monetize,” available at: <https://about.ads.microsoft.com/en/solutions/technology/microsoft-monetize#ad-server>. Accessed July 24, 2024; Apple, “Workbench overview,” available at: <https://support.apple.com/guide/adguide/workbench-overview-apdc1ec97129/icloud>. Accessed July 24, 2024; Adform, “The Adform Ad Server,” available at: <https://site.adform.com/solutions/ad-server/>. Accessed July 24, 2024; Web Archive, “AdGear Publisher,” available at: <https://web.archive.org/web/20160414093933/http://adgear.com/products/publisher>. Accessed July 24, 2024; AdExchanger, “Samsung To Acquire Canadian DSP And Ad Server AdGear,” available at: <https://www.adexchanger.com/digital-tv/samsung-acquire-canadian-dsp-ad-server-adgear/>. Accessed July 24, 2024; AdButler, “Display Ad Server,” available at: <https://www.adbutler.com/solutions/display-ad-server.html>. Accessed July 24, 2024; AdGlare, “Manage and deliver online ads,” available at: <https://www.adglare.com/>. Accessed July 24, 2024; Software Advice, “Epom,” available at: <https://www.softwareadvice.com/ad-server/epom-profile/>. Accessed July 24, 2024; ExAds, “White-Label Ad Server,” available at: <https://www.exads.com/products/white-label-ad-server>. Accessed July 24, 2024; Revive Adserver, “Revive Adserver,” available at: <https://www.revive-adserver.com/>. Accessed July 24, 2024; AdPlugg, “Ad Server and Ad Manager,” available at: <https://www.adplugg.com/>. Accessed July 24, 2024; AdSpeed, “AdSpeed AdServer – Loved by publishers, advertisers, ad networks and agencies,” available at: <https://www.adspeed.com/>. Accessed July 24, 2024; Web Archive, “AdvertServe combines everything you need into a unified ad serving platform for web, mobile, e-mail, and video,” available at: <http://web.archive.org/web/20230722070340/https://www.advertserve.com/>. Accessed July 24, 2024; Inout Scripts, “Inout Adserver,” available at: <https://www.inoutscripts.com/products/adserver/>. Accessed July 24, 2024; AdServing Factory, “EAS Ad Server for Publishers,” available at: <https://www.adservingfactory.com/ad-server-for-publishers.html>. Accessed July 24, 2024; Nativo, “Nativo’s Next Gen Ad Server And Monetization Platform Gains Wide Adoption With Premium Publishers,” available at: <https://www.nativo.com/newsroom/nativos-next-generation-ad-server-and-monetization-platform-gains-wide-adoption>.



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**3. Bureau of Labor Statistics Price Index Data**

104) The “U.S. Bureau of Labor Statistics Price Index Data” used in analyses consists of various publicly available price index series. The indices utilized are CUUR0000SA0 (CPI-U), CUUR0000SA0L1E (CPI-U less food and energy) from the Consumer Price Index Survey, WPU00000000 (all commodities), WPU361102 (advertising space sales in newspapers), WPU36110203 (advertising space in print newspapers), WPU36110204 (advertising space in digital or digital-print bundled newspapers), WPU361101 (advertising space sales in periodicals) from the Producer Price Index Commodity Survey, and PCU5111405111401 (directory and mailing list publishing - advertising sales incl. telephone directory listings) from the Producer Price Index Industry Survey.

*a) Producer Price Index (PPI)*

105) A producer price index (or PPI) represents the average relative change in prices received by U.S. producers for their output. In the case of advertising PPIs, what is being measured is the change in prices received by publishers for their ad inventory. PPIs utilized in this report are

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Accessed July 24, 2024; NUI Media, “Ad Serving That Makes Sense,” available at: <https://www.nuimedia.com/ad-server/>. Accessed July 24, 2024; Prebid, “Prebid Server Overview,” available at: <https://docs.prebid.org/prebid-server/overview/prebid-server-overview.html>. Accessed July 24, 2024; Prebid, “Use Case: Prebid Server | Prebid.js,” available at: <https://docs.prebid.org/prebid-server/use-cases/pbs-pbjs.html>. Accessed July 24, 2024; Admixer, “Free Ad Server,” available at: <https://admixer.com/free-ad-server/>. Accessed July 24, 2024; dJAX Adserver, “dJAX Adserver: Build Your Adserver in Few Weeks or Months, And Not Years,” available at: <https://www.djaxadserver.com/>. Accessed July 24, 2024; Internet BillBoard, “We solve all that publishers need,” available at: <https://www.ibillboard.com/en/for-publishers/>. Accessed July 24, 2024; inClick Ad Server, “Comprehensive Feature List,” available at: <https://www.inclick.net/pageid/solution/completeness.html>. Accessed July 24, 2024; UpRival, “The All-in-One Ad Server Solution,” available at: <https://lp.uprival.com/atp-optin>. Accessed July 24, 2024; FreeWheel, “For Sellers SupplySuite,” available at: <https://www.freewheel.com/supplysuite>. Accessed July 24, 2024; INVIDI Technologies, “These Are The Supply-Side Ad Servers Trying To Win The Next Generation of TV,” available at: <https://www.invidi.com/news/these-are-the-supply-side-ad-servers-trying-to-win-the-next-generation-of-tv/>. Accessed July 24, 2024; Publica, “The Ad Server designed for TV Broadcasters,” available at: <https://www.getpublica.com/>. Accessed July 24, 2024; Nexxen, “The ad server designed to help you maximize your incremental revenue,” available at: <https://nexxen.com/broadcasters-publishers/#adserver>. Accessed July 24, 2024; Variety, “Why Disney Built Its Own Ad Server for Disney+ and Hulu – and What the YODA Does,” available at: <https://variety.com/2023/digital/news/disney-ad-server-tech-disney-plus-yoda-1235497663/>. Accessed July 24, 2024; AdSpirit, “AdServer features,” available at: <https://www.adspirit.com/en/adserver-features/>. Accessed July 24, 2024; Outbrain, “Native Ad Server,” available at: <https://www.outbrain.com/publishers/native-ad-server/>. Accessed July 24, 2024; AdKernel, “White-Label Ad Server,” available at: <https://adkernel.com/white-label-ad-server/>. Accessed July 24, 2024; AVID Ad Server, “Ad Serving – Made Easy,” available at: <https://www.avidadserver.com/>. Accessed July 24, 2024.

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not seasonally adjusted but may be re-indexed to a common base period when being compared to other price indices.

*b) Consumer Price Index (CPI)*

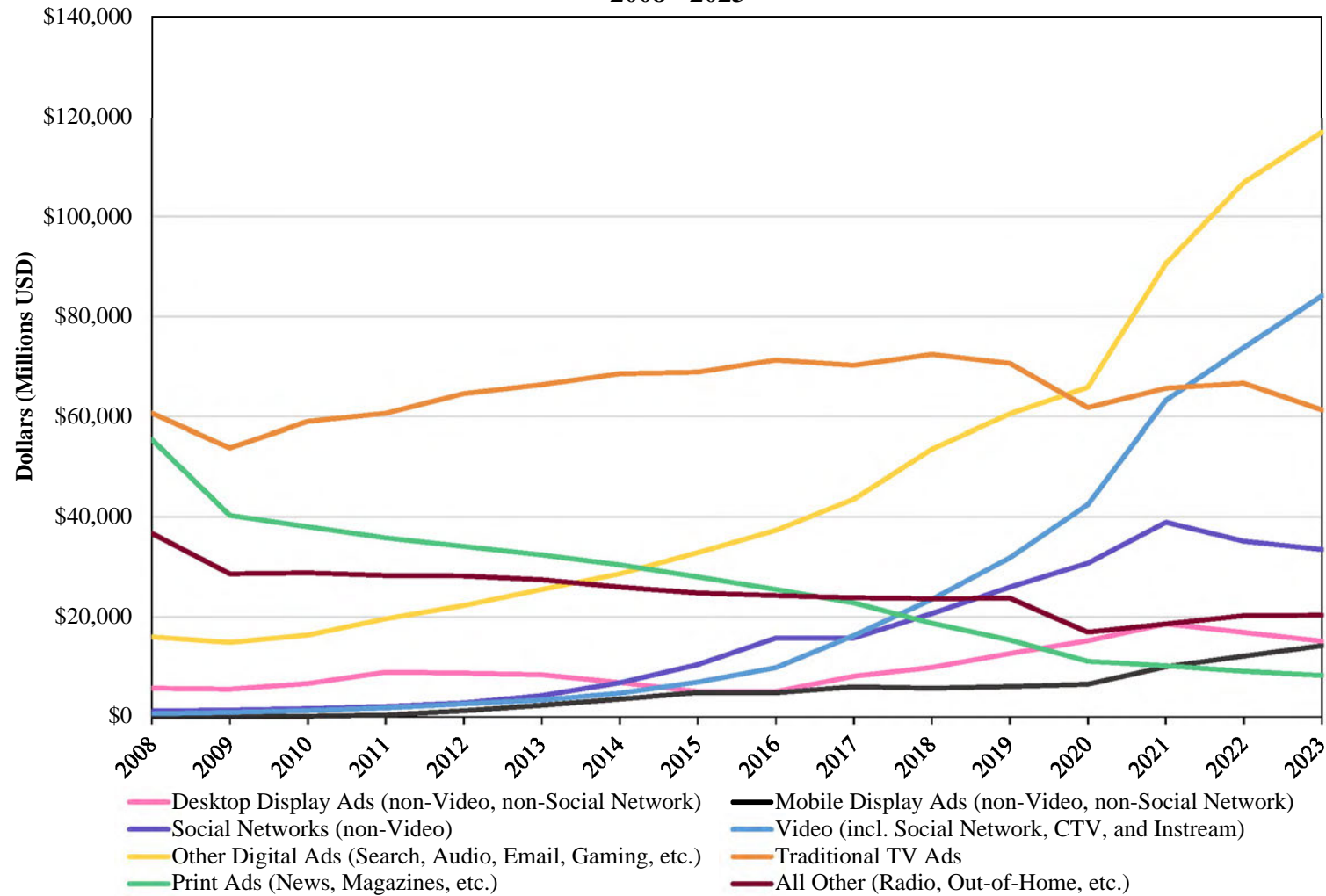
106) The consumer price index CPI-U or CPI-U Less Food & Energy represents the average change to cost of living for urban consumers. They are among the most common measures for how general prices change over time for consumers. These series are not seasonally adjusted, but may be re-indexed to a common base period when being compared to other price indices.

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## **APPENDIX VIII. FIGURES**

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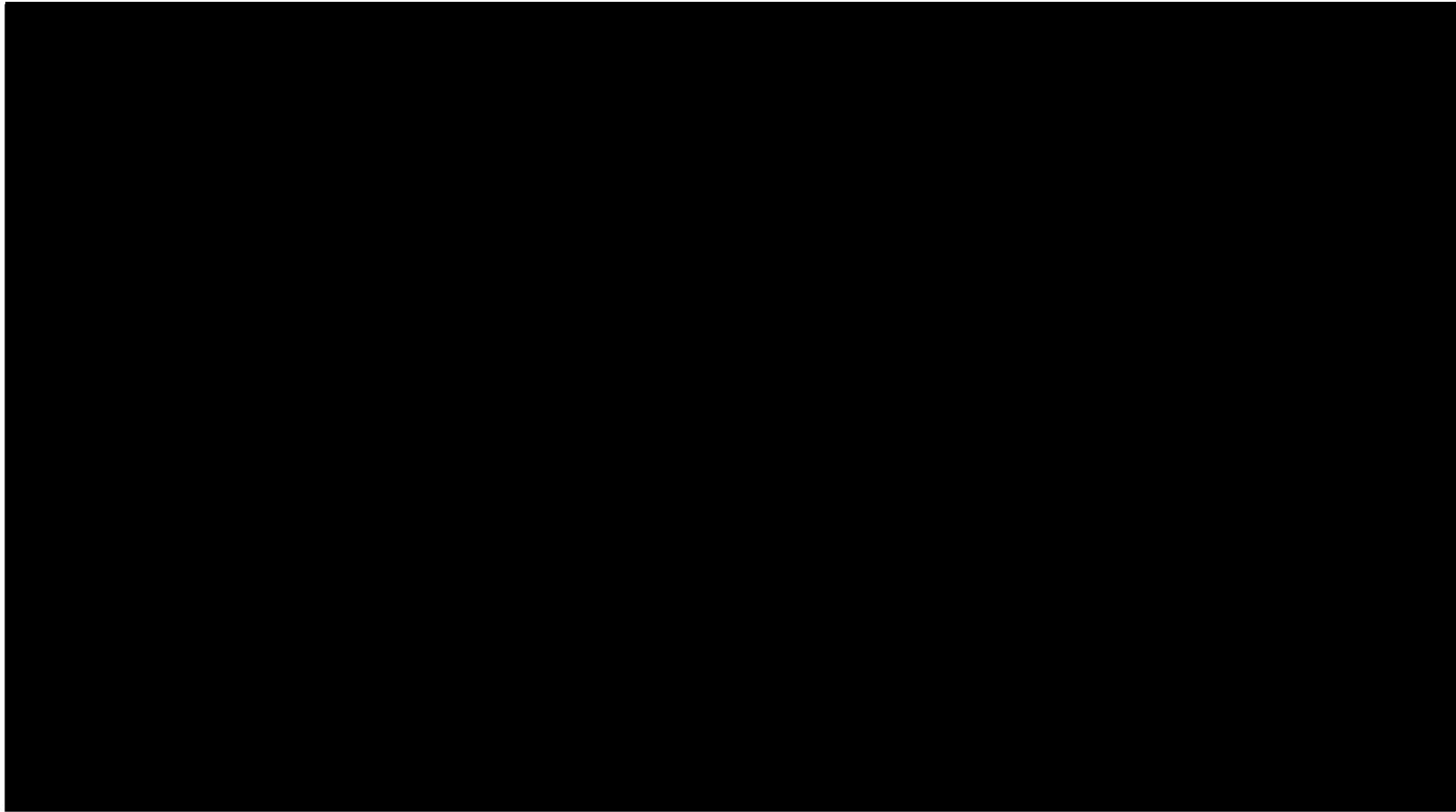
**Figure 1**  
**U.S. Ad Spending by Environment and Ad Type**  
**2008 - 2023**



Notes: eMarketer data does not distinguish between ads purchased directly and indirectly; data are inclusive of all potential transaction types.

Source: DOJ RFP 57 eMarketer Data - "U.S. Ad Spending 2023."

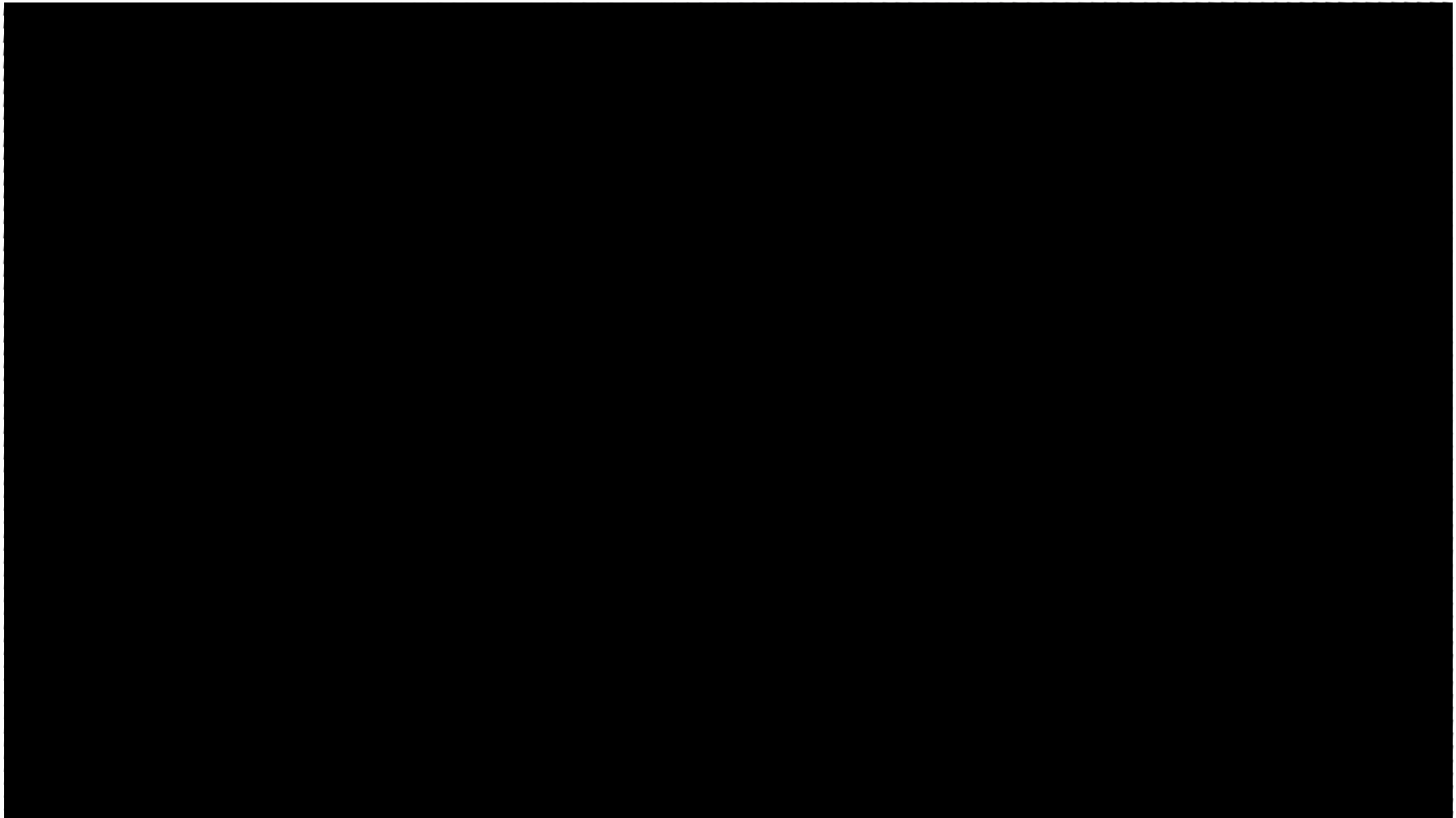
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Notes: Cost per click has been calculated as total ad spend divided by total clicks. Data have been limited to transactions where inventory\_source is “3PE,” “AdExchange,” or “Demand Product” and excluding transactions through Ad Sense.

Source: MDL RFP 243 Google Ads Data.

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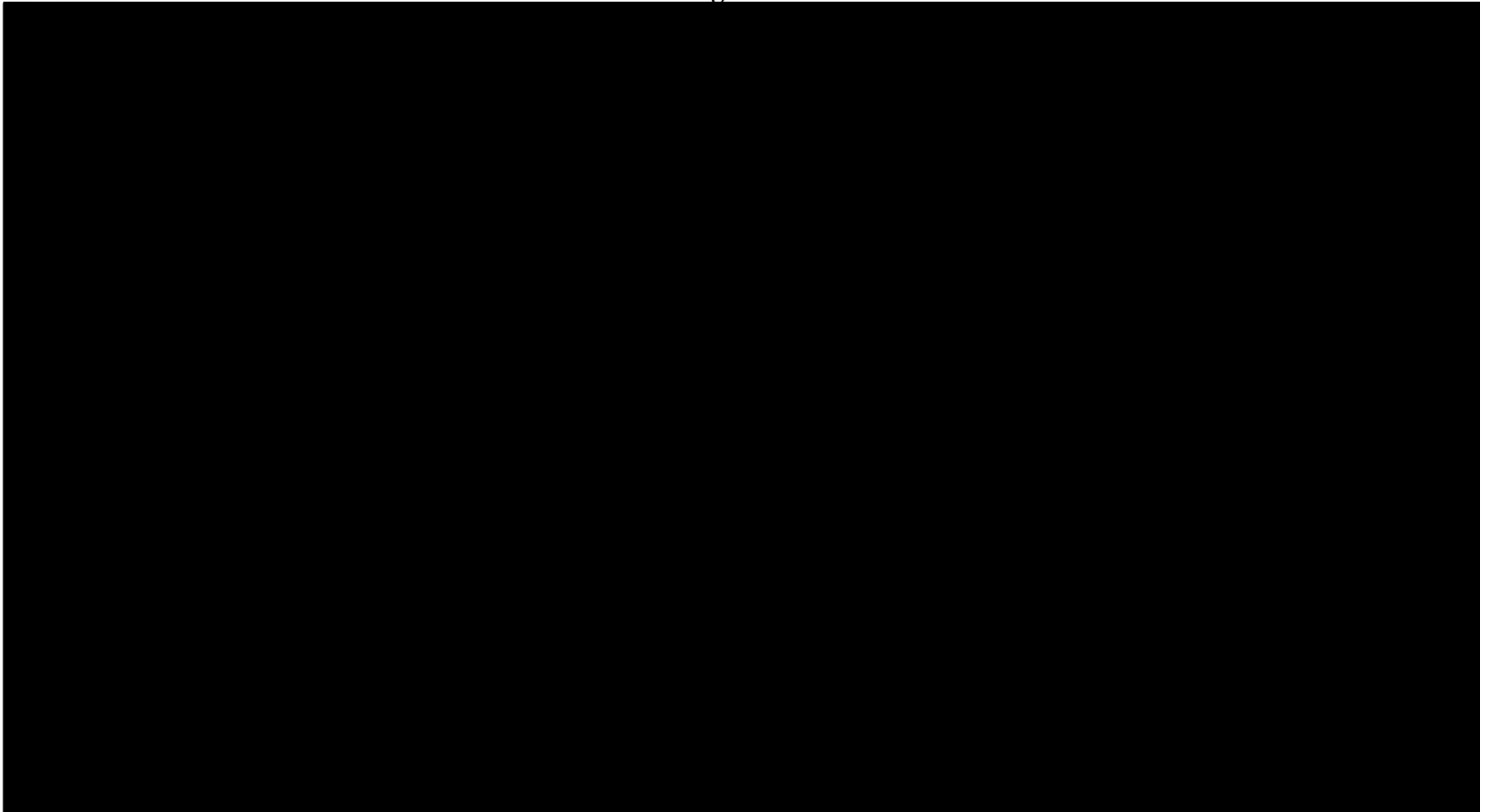


Notes: Values have been defined as paid for on a CPC-basis if cost\_model is “cpc,” or “cpc\_to\_cpm,” paid for on a CPM-basis if cost model is “cpm,” and paid for on another basis if cost\_model is none of the above. Values with cost\_model “unbillable” have been excluded.

Source: MDL RFP 243 Google Ads Data.

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**Figure 4**



Notes: Impressions have been defined as paid for on a CPC-basis if cost\_model is “cpc,” or “cpc\_to\_cpm,” excluding unbillable queries.

Source: MDL RFP 243 Google Ads Data.

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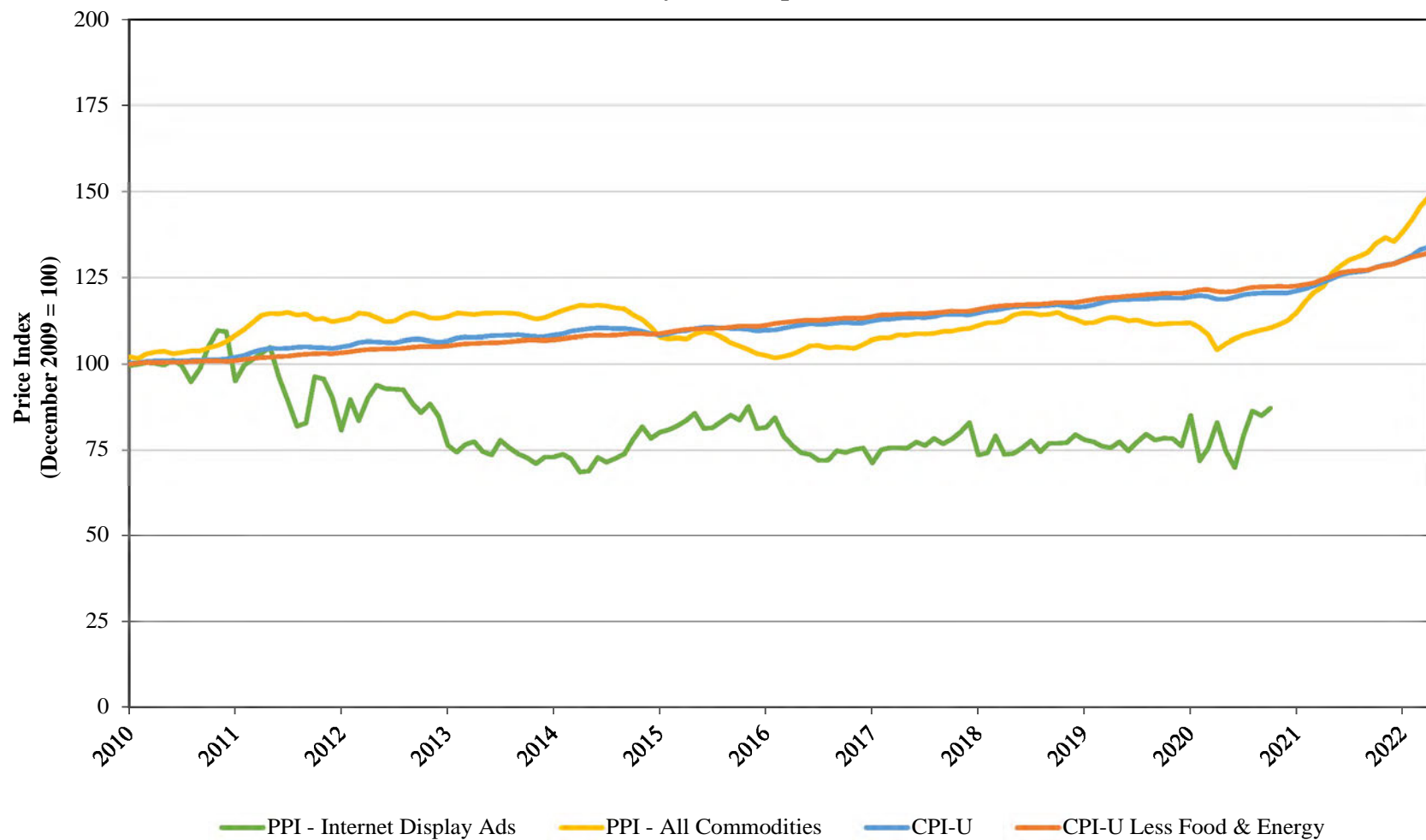


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**Figure 7**  
**PPI for Internet Display Ads vs. Other Price Measures**  
**January 2010 - April 2022**

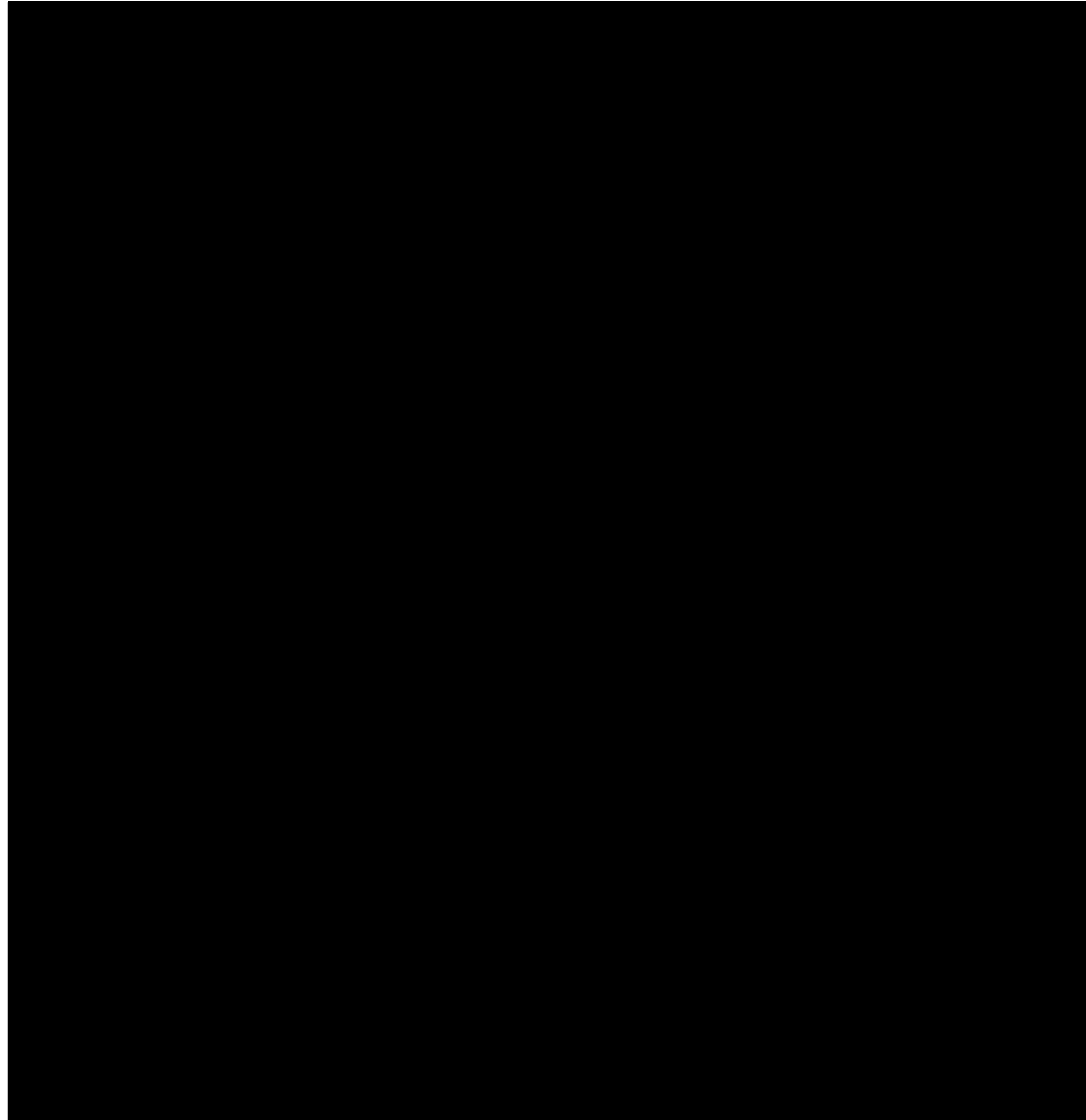


Notes: Advertising PPIs measure the average relative change in prices received by U.S. publishers for their ad inventory. Consumer price index CPI-U represents average changes to the cost of living for urban consumers. The internet display ad series and all commodities PPI series are based on the BLS industry and commodity surveys respectively. Series have not been seasonally adjusted but have been re-indexed to the common base period of December 2009.

Source: Bureau of Labor Statistics Price Index Data.

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**Figure 8**

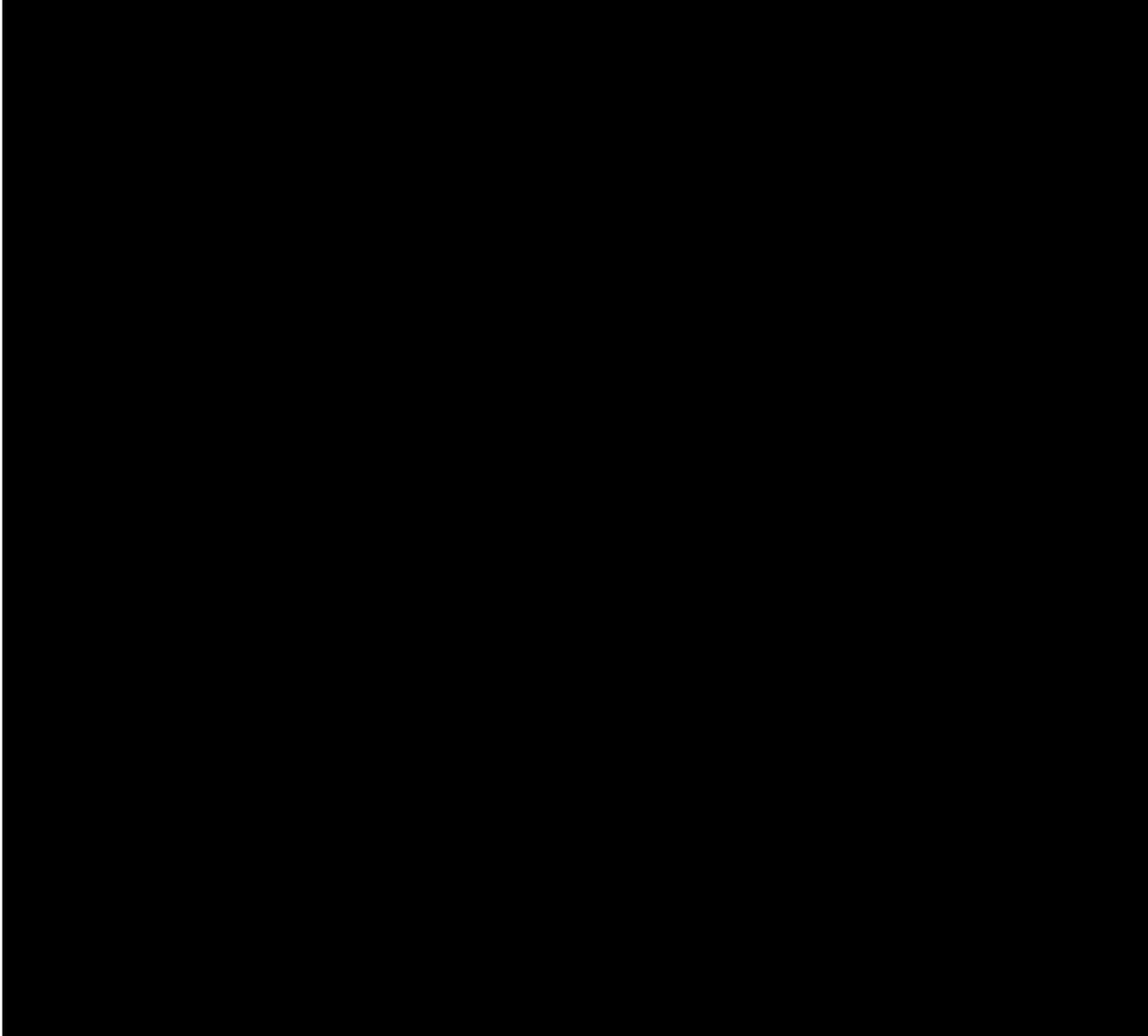


Notes: Impression volumes are aggregated by standardized company name.

Source: MDL RFP 243 AdX Data.

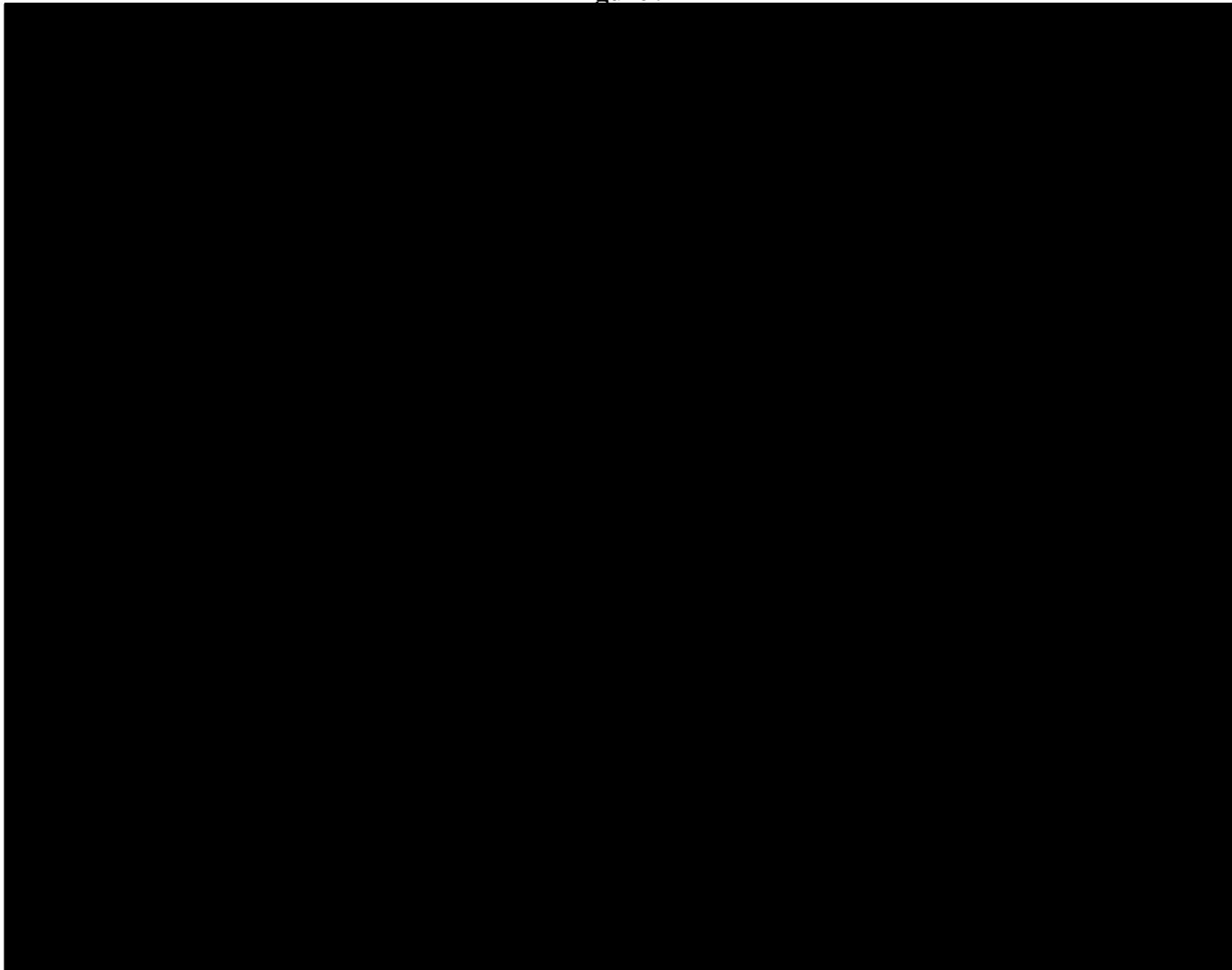
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**Figure 9**



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**Figure 9**



Notes: Impression volumes are aggregated by standardized company name. This figure includes exchanges with more than one million impressions. Six exchanges with positive volume of impressions were below this threshold.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 10**  
**List of Ad Servers**

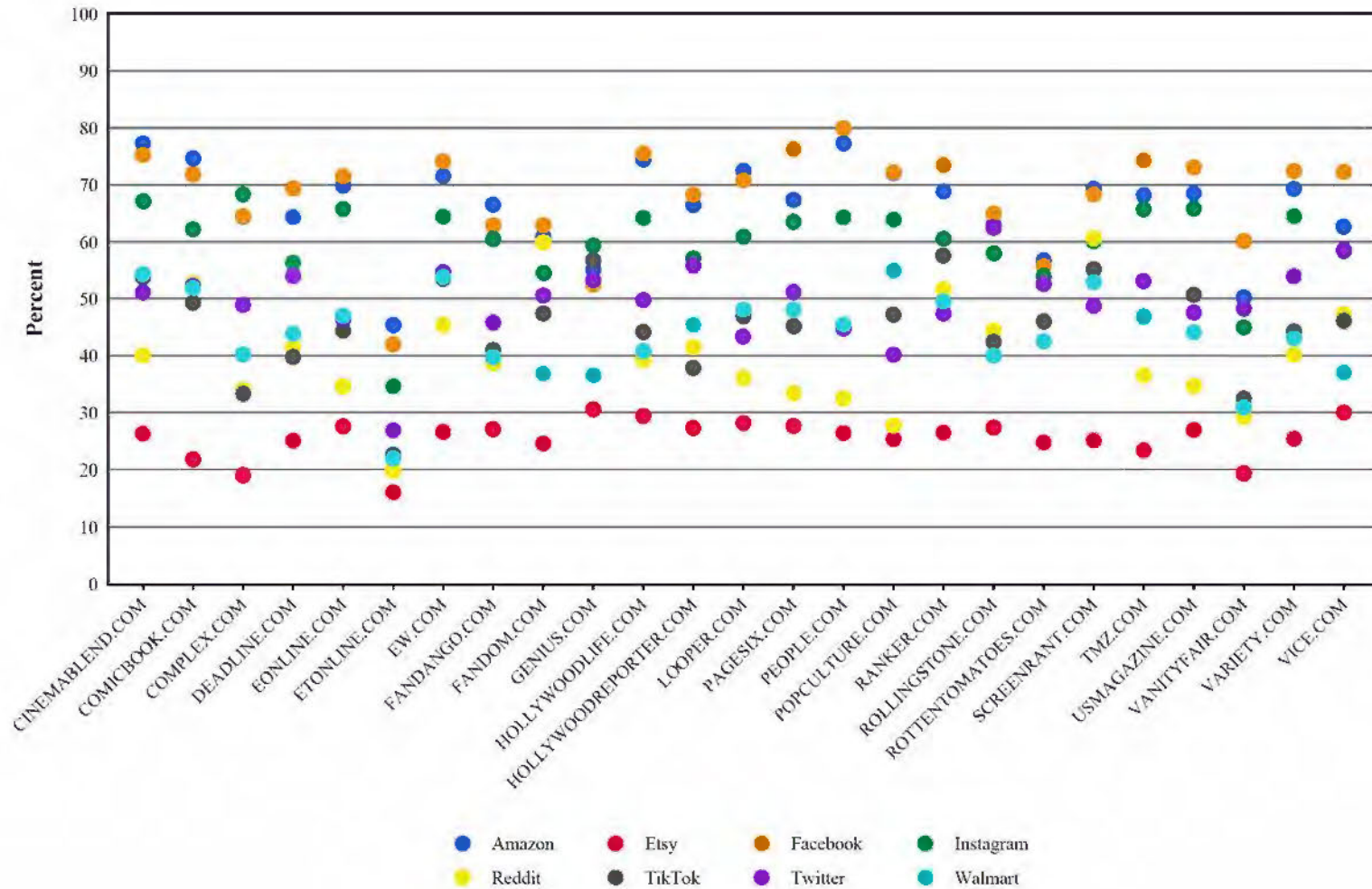
<b>Product Name</b>	<b>Company Name</b>
<b>(a)</b>	<b>(b)</b>
Equativ	Equativ
Kevel Ad Server	Kevel
SpringServe Ad Server	Magnite
Smaato SPX	Verve Group
Broadstreet Ads	Broadstreet Ads
Microsoft Monetize (Formerly Xandr Monetize)	Microsoft
Apple Workbench	Apple
AdForm Ad Server	AdForm
AdGear	Samsung
AdButler Display Ad Server	AdButler
AdGlare	AdGlare
Epom Ad Server	Epom
White-Label Ad Server	ExAds
Revive Adserver	Revive Adserver
AdPlugg	AdPlugg
AdSpeed AdServer	AdSpeed
AdvertServe	Advert Serve
Inout Adserver	Inout Scripts
EAS Ad Server	AdServing Factory
Nativo	Nativo
NUI Ad Server	NUIMedia
Prebid Server	Prebid
AdMixer	AdMixer
dJAX Adserver	dJAX
iBillboard Ad Server	iBillboard
inClick Ad Server	InClick
UpRival	UpRival
FreeWheel	Comcast
Publica	Publica
Nexxen Ad Server	Nexxen
Disney Ad Server	The Walt Disney Company
AdSpirit AdServer	AdSpirit
Outbrain	Outbrain
AdKernel	AdKernel
AVID Ad Server	AVID Ad Server

Notes: Data are collected from various online sources.

Source: See Methodology Appendix.

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**Figure 11**  
**Percentage of Entertainment Website Visitors Also Visiting Out of Market Websites**  
**April 2022**

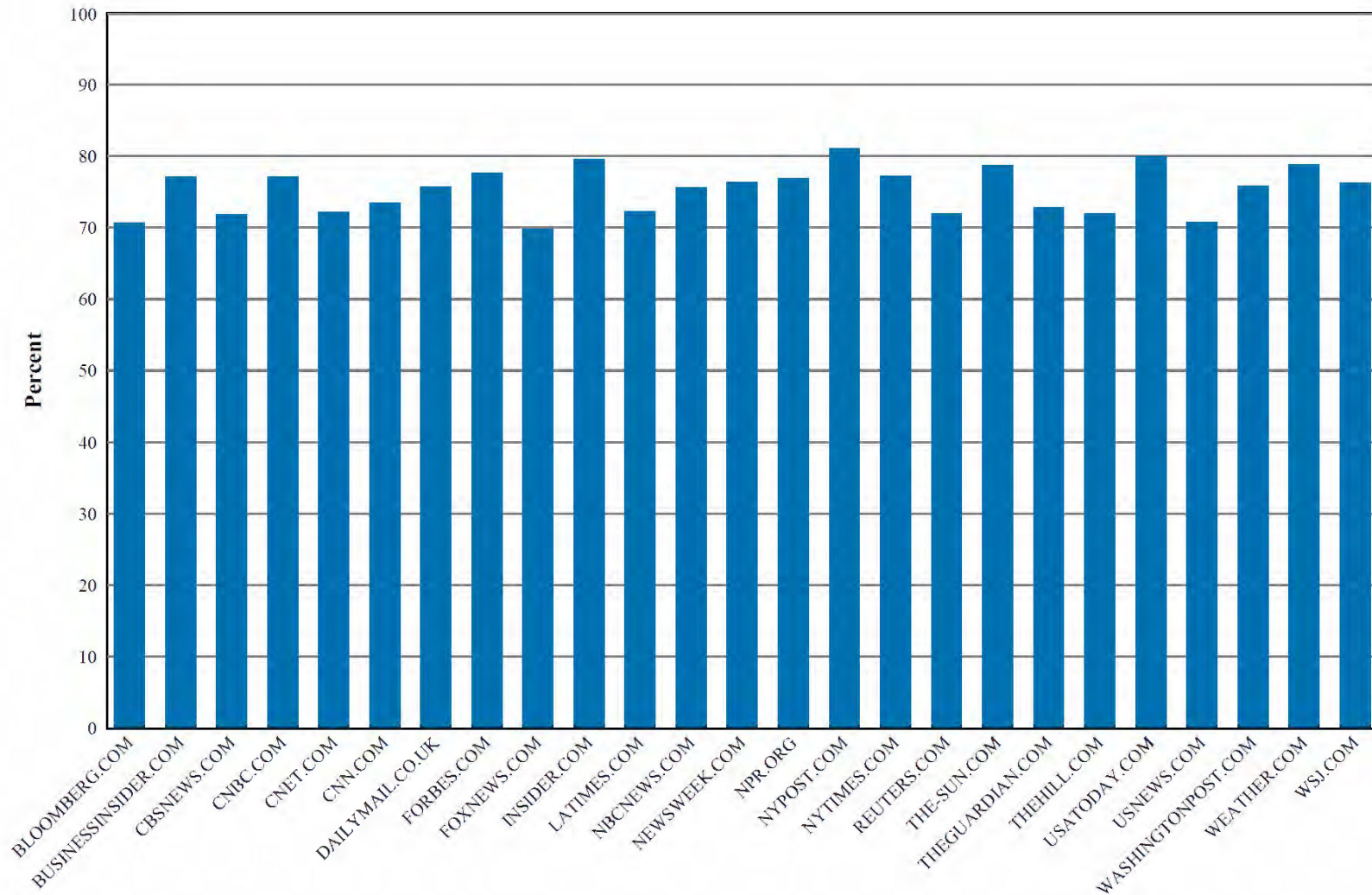


Notes: This chart shows the percentage of all visitors to each website shown on the X axis that also visited out of market websites during April 2022.

Source: DOJ RFP 57 Comscore April 2022 Top25Ent SocMedAWE.

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**Figure 12**  
**Percentage of News Website Visitors Also Visiting Facebook**  
**April 2022**



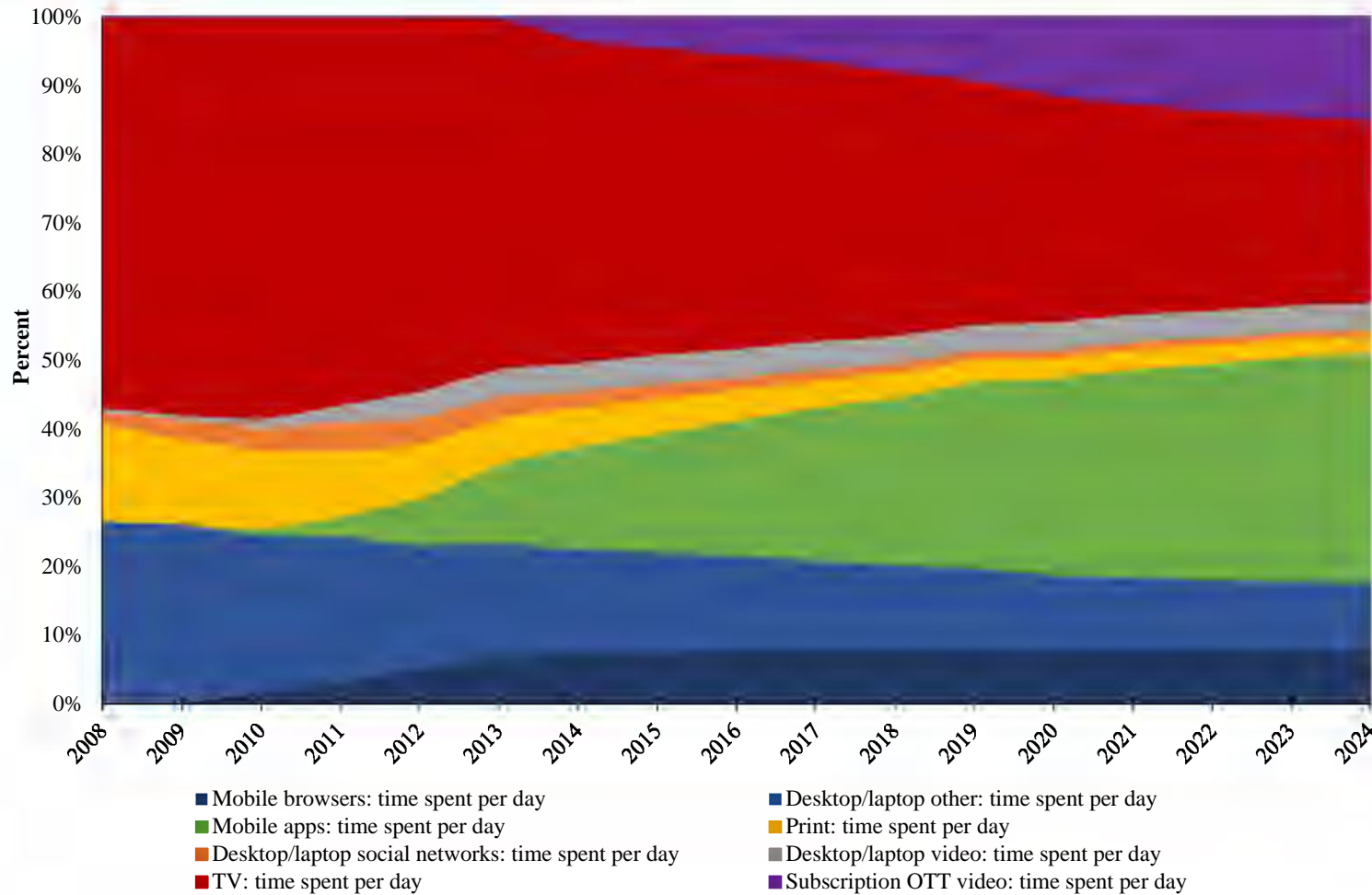
Notes: This chart shows the percentage of all visitors to each website shown on the X axis that also visited Facebook during April 2022.

Source: DOJ RFP 57 Comscore April 2022 Top25News SocMedAWE.



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**Figure 13**  
**Makeup of U.S. Adults' Average Daily Time Spent on Forms of Media**  
**2008-2024**

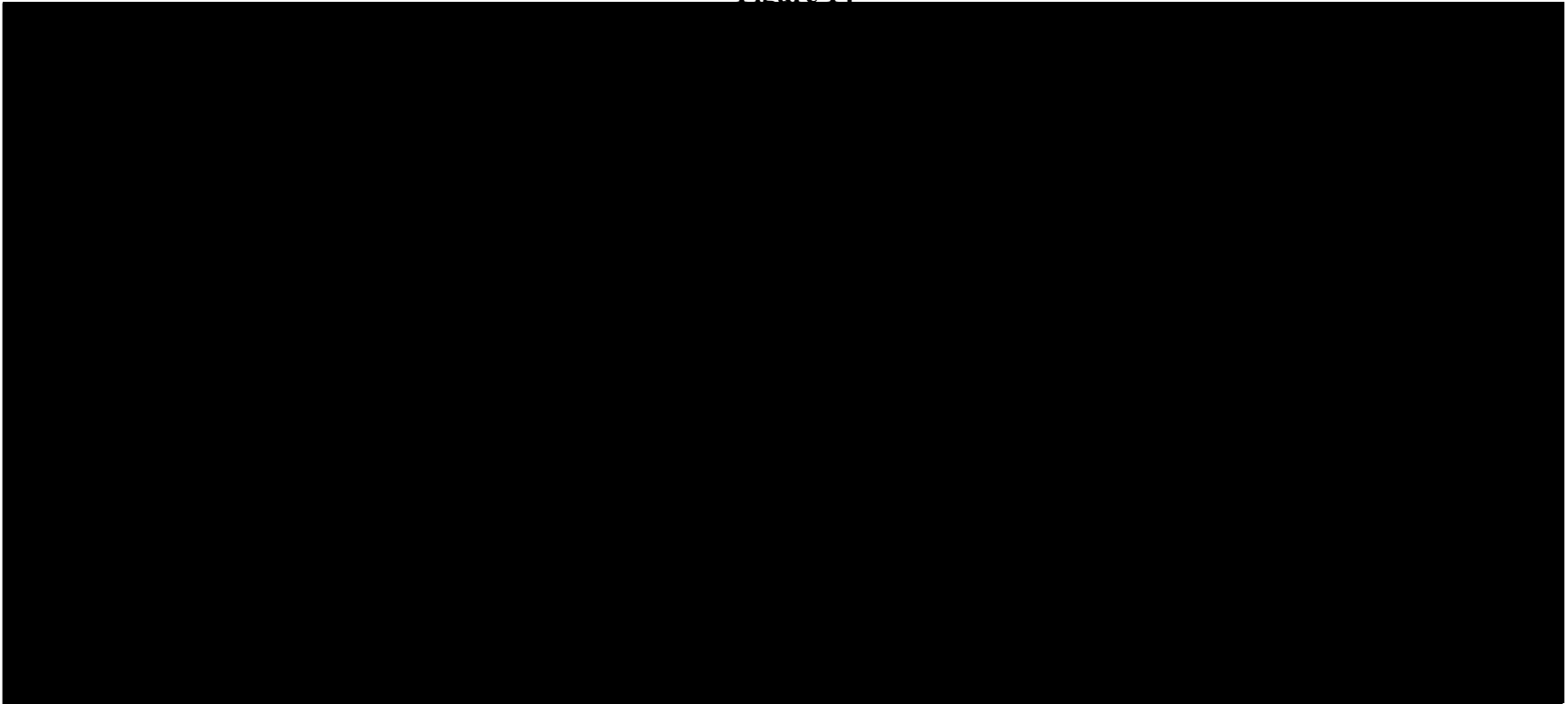


Notes: Blue segments represent media formats showing Plaintiffs' experts "narrow" definition of display ads, although eMarketer definitions and data collection methodology slightly differ.

Source: DOJ RFP 57 eMarketer Data - "U.S. Time Spent with Connected Devices."

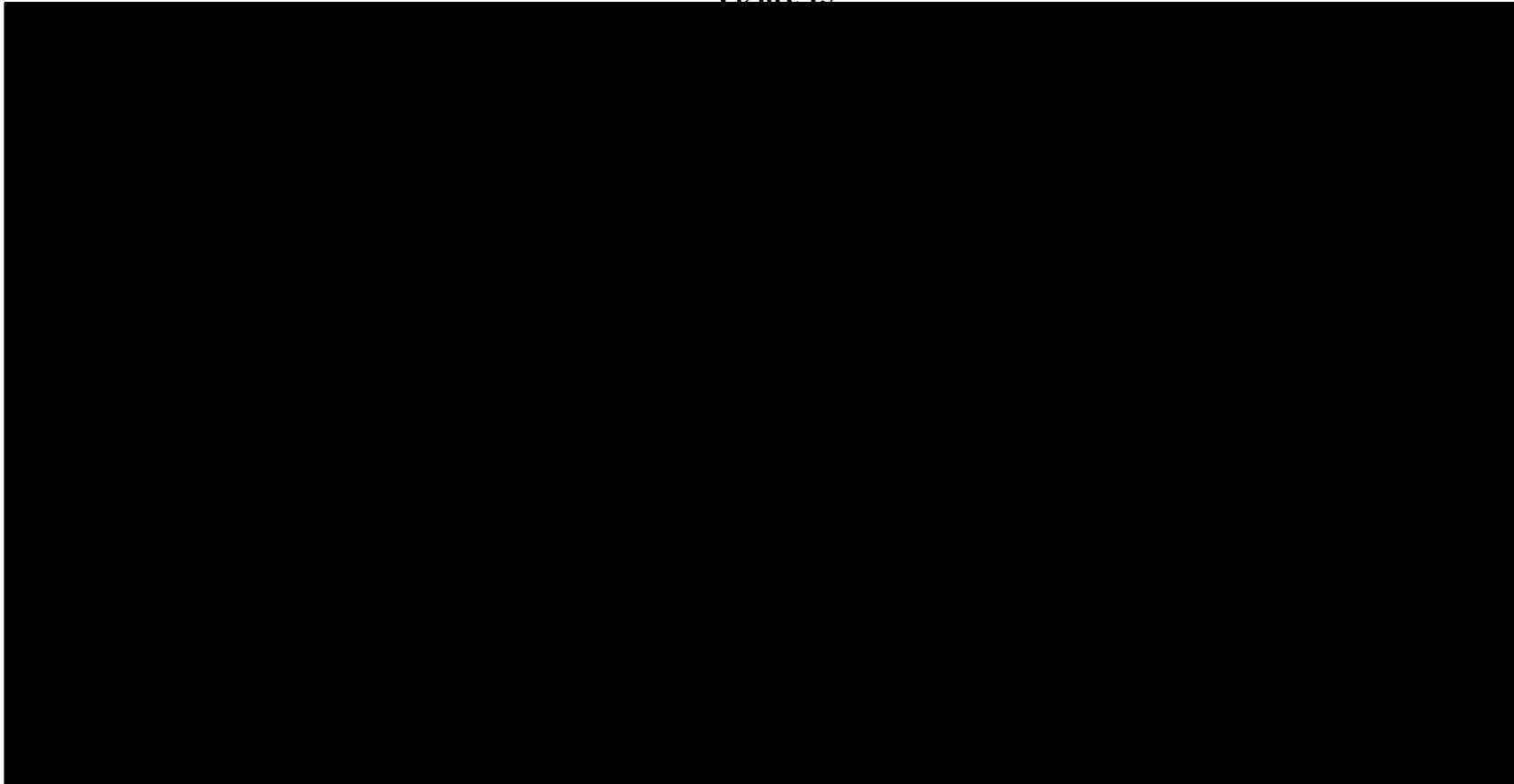
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**Figure 14**

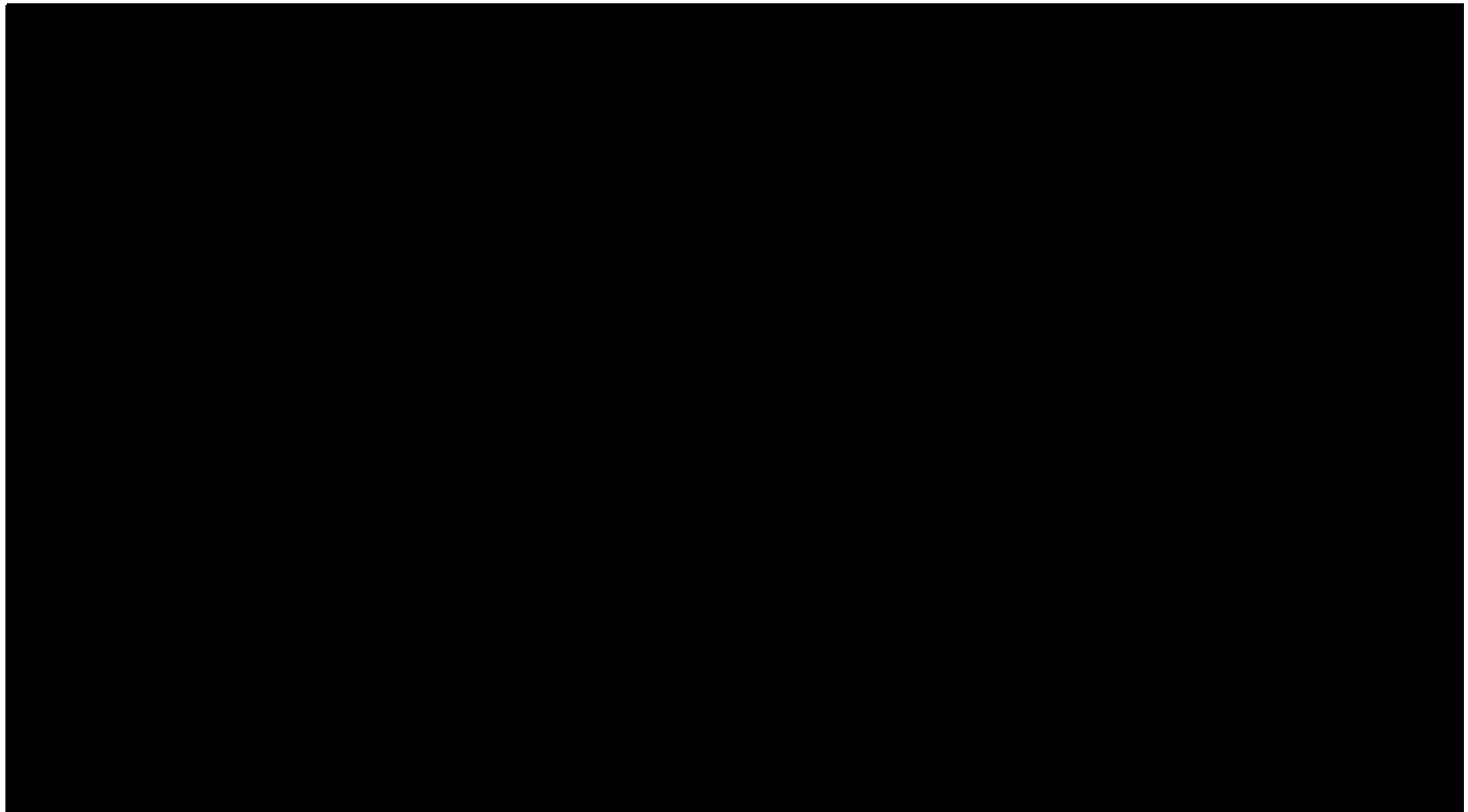


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**Figure 15**

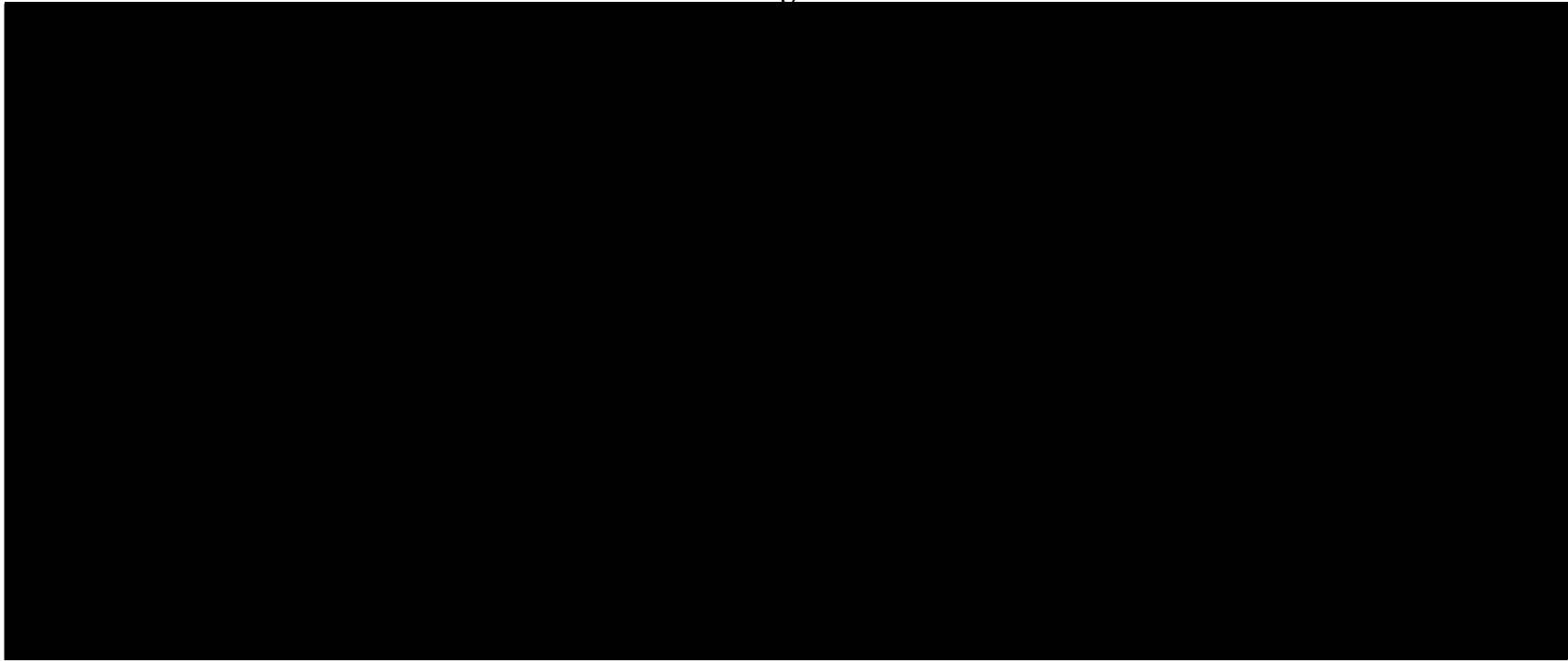


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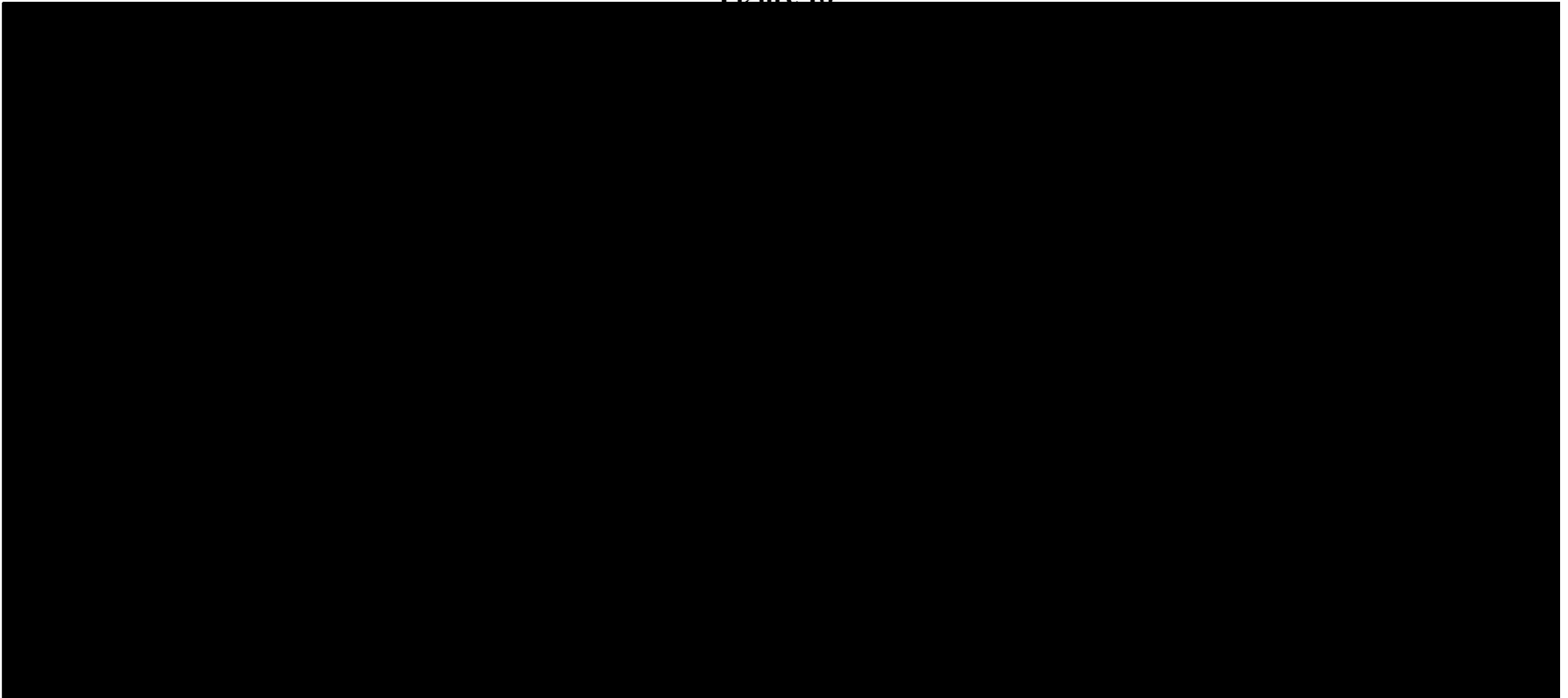
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**Figure 17**



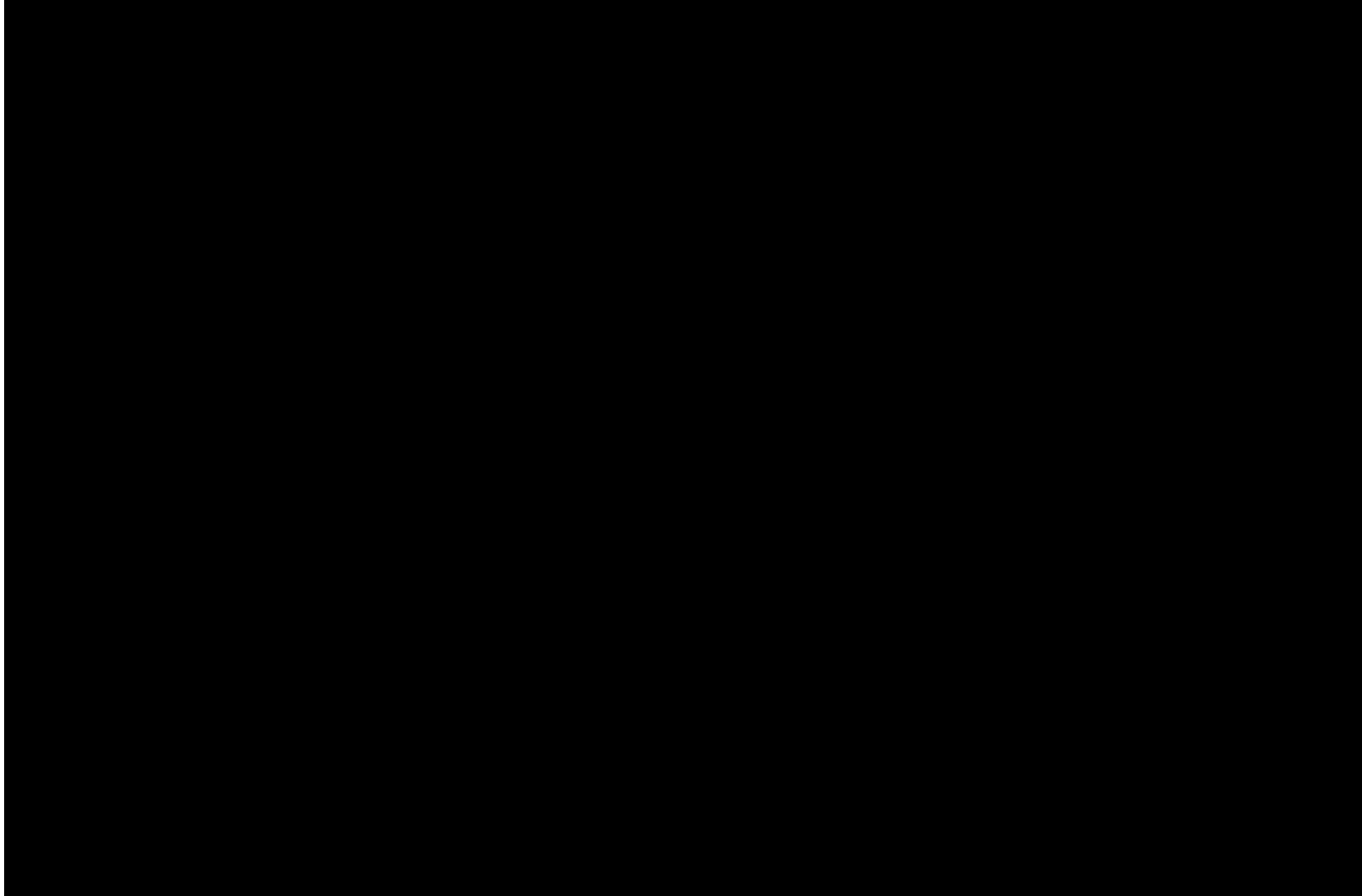
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**Figure 18**



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**Figure 19**

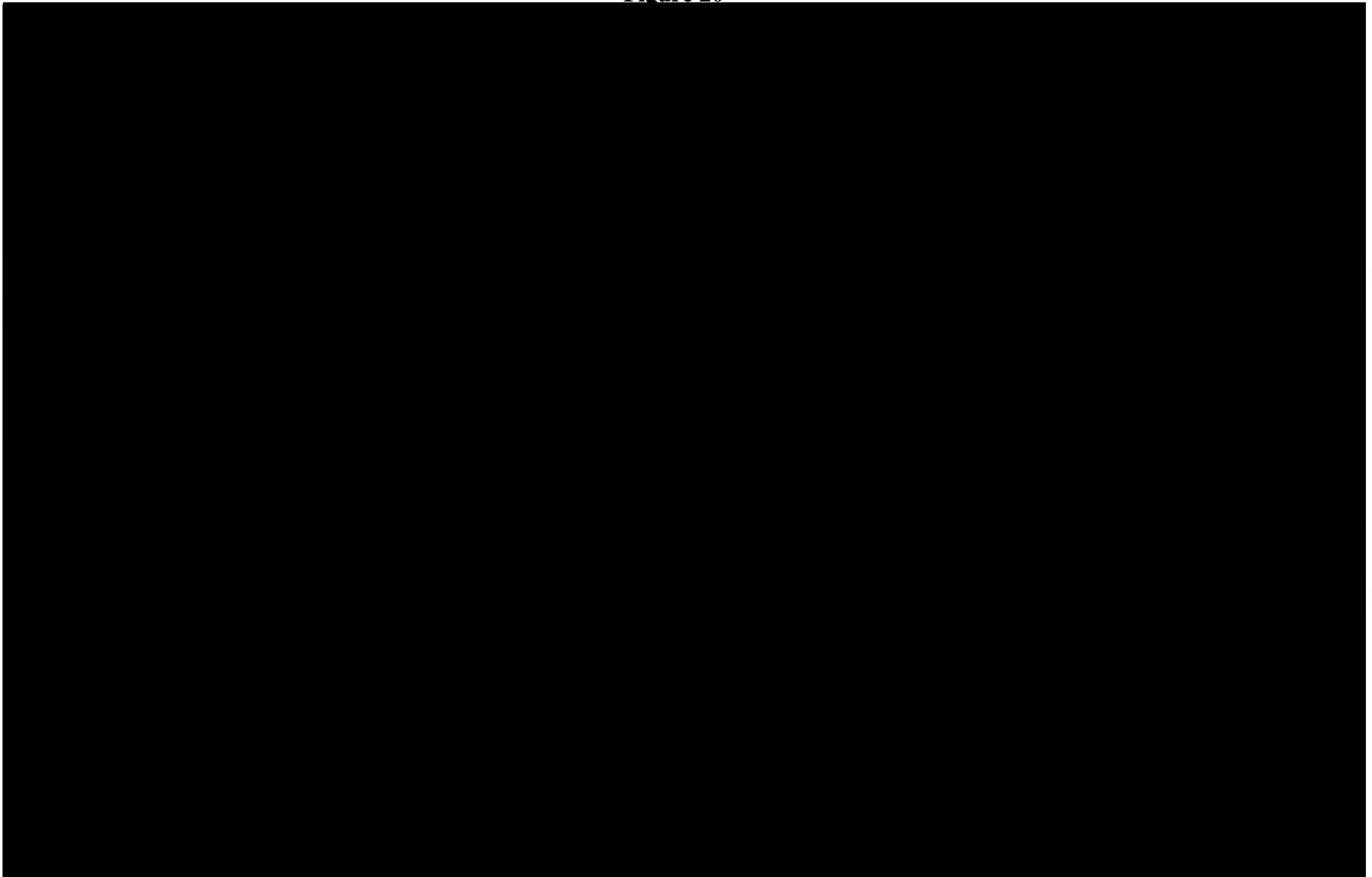


Notes: Advertisers are considered to be using a channel if greater than 0.5 percent of their total ad spend is on that channel.

Source: MDL DV360 XBridge Data; MDL RFP 243 Google Ads Data.

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**Figure 20**

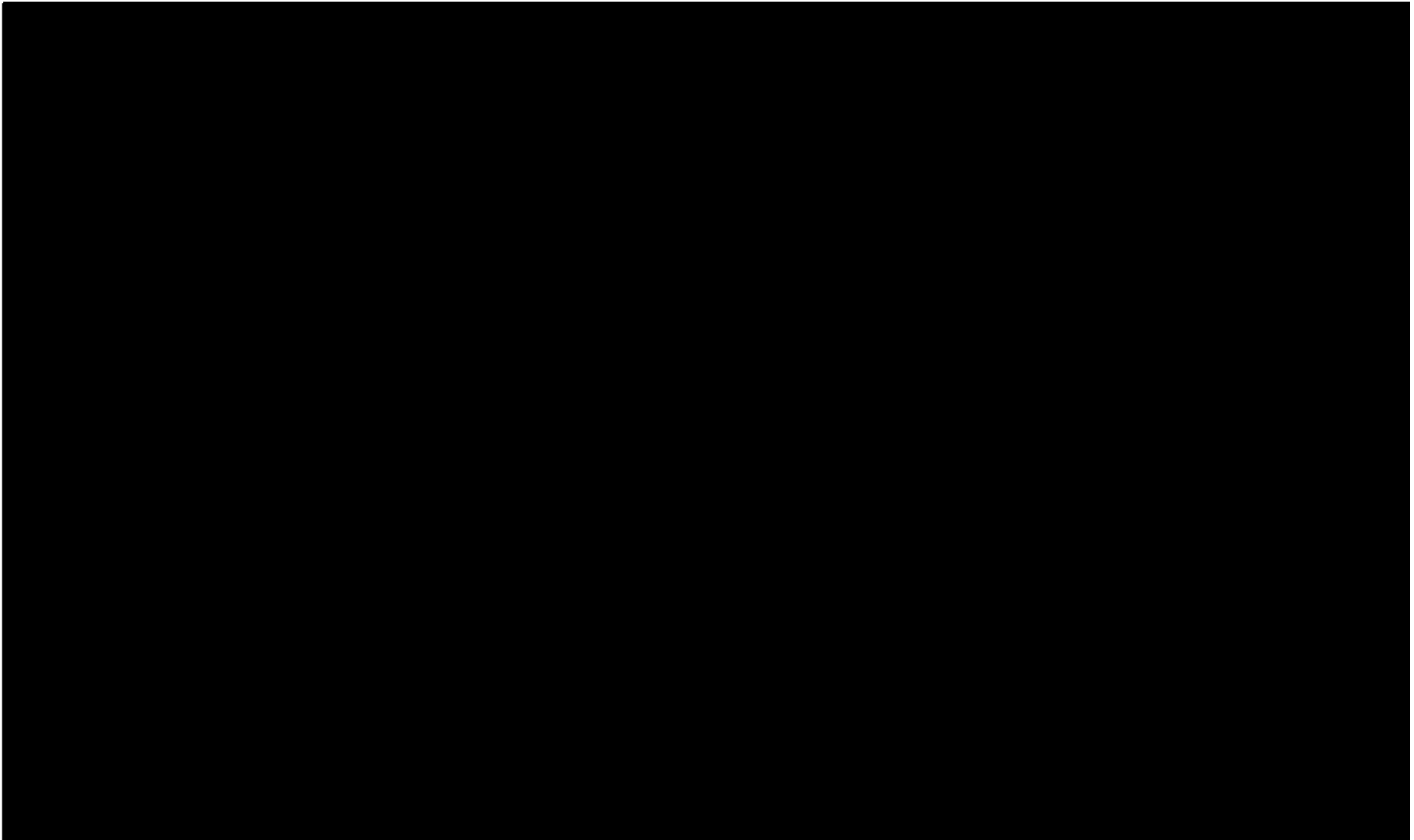


Notes: Ad spend is only counted for an advertiser on a given channel if greater than 0.5 percent of their total ad spend is on that channel.

Source: MDL DV360 XBridge Data; MDL RFP 243 Google Ads Data.



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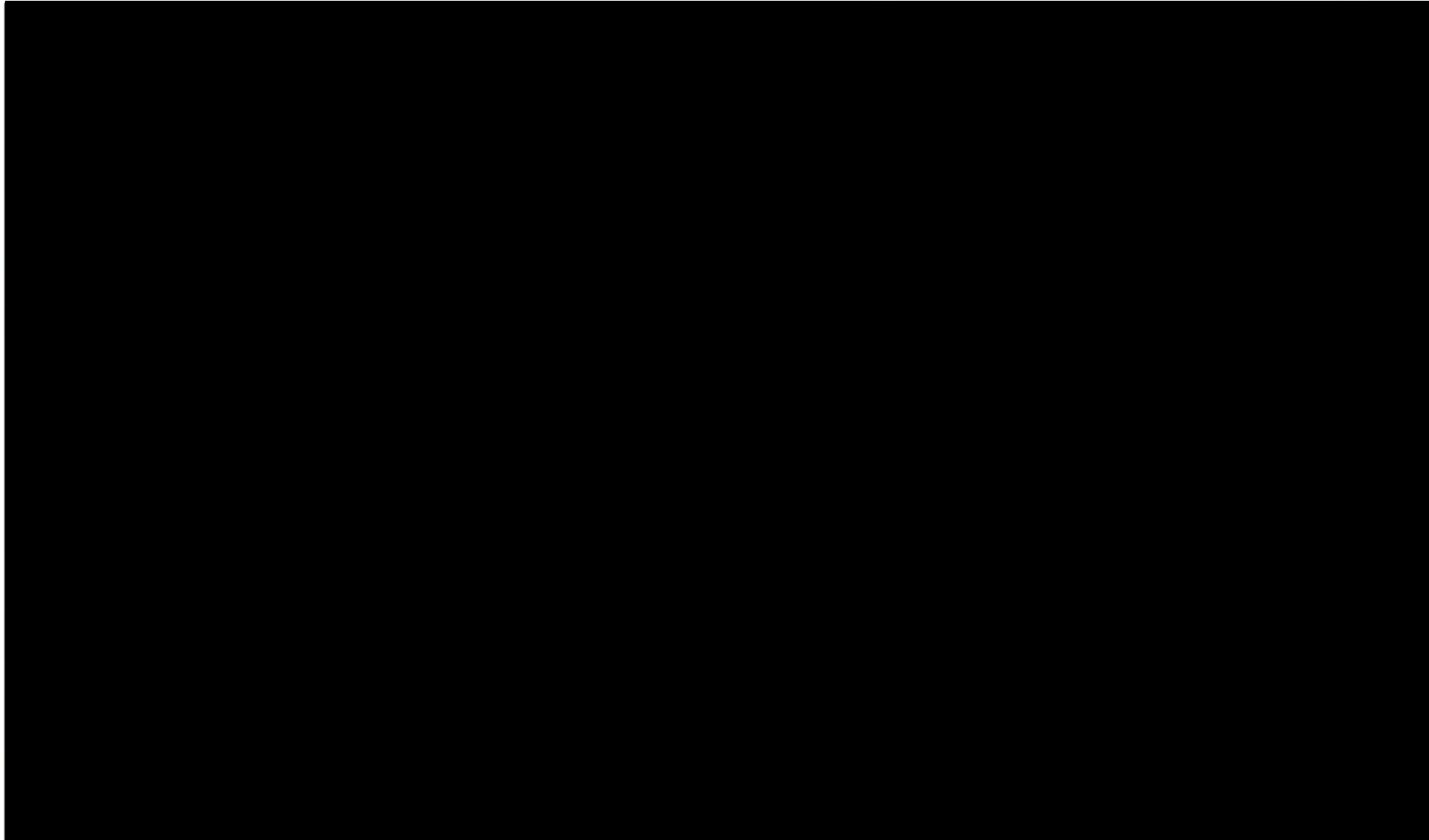


Notes: Publishers are considered to be using a channel if greater than 0.5 percent of their total impressions are on that channel. Prior to 2017, DFP Reservations data have undefined user\_device and is\_mobile\_app\_request fields necessary to identify the candidate market.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 22**



Notes: Publishers are considered to be using a channel if greater than 0.5 percent of their total impressions are on that channel. Prior to 2017, DFP Reservations data have undefined user\_device and is\_mobile\_app\_request fields necessary to identify the candidate market.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 23**  
**Count of AdX and DFP Publishers Selling Display Ads (Narrow) Plus Direct Deals**  
**Viewed by U.S. Users through an Ad Server (DFP)**  
**By Whether Publishers Sell Ads on Other Channels**  
**January 2017 - March 2023**

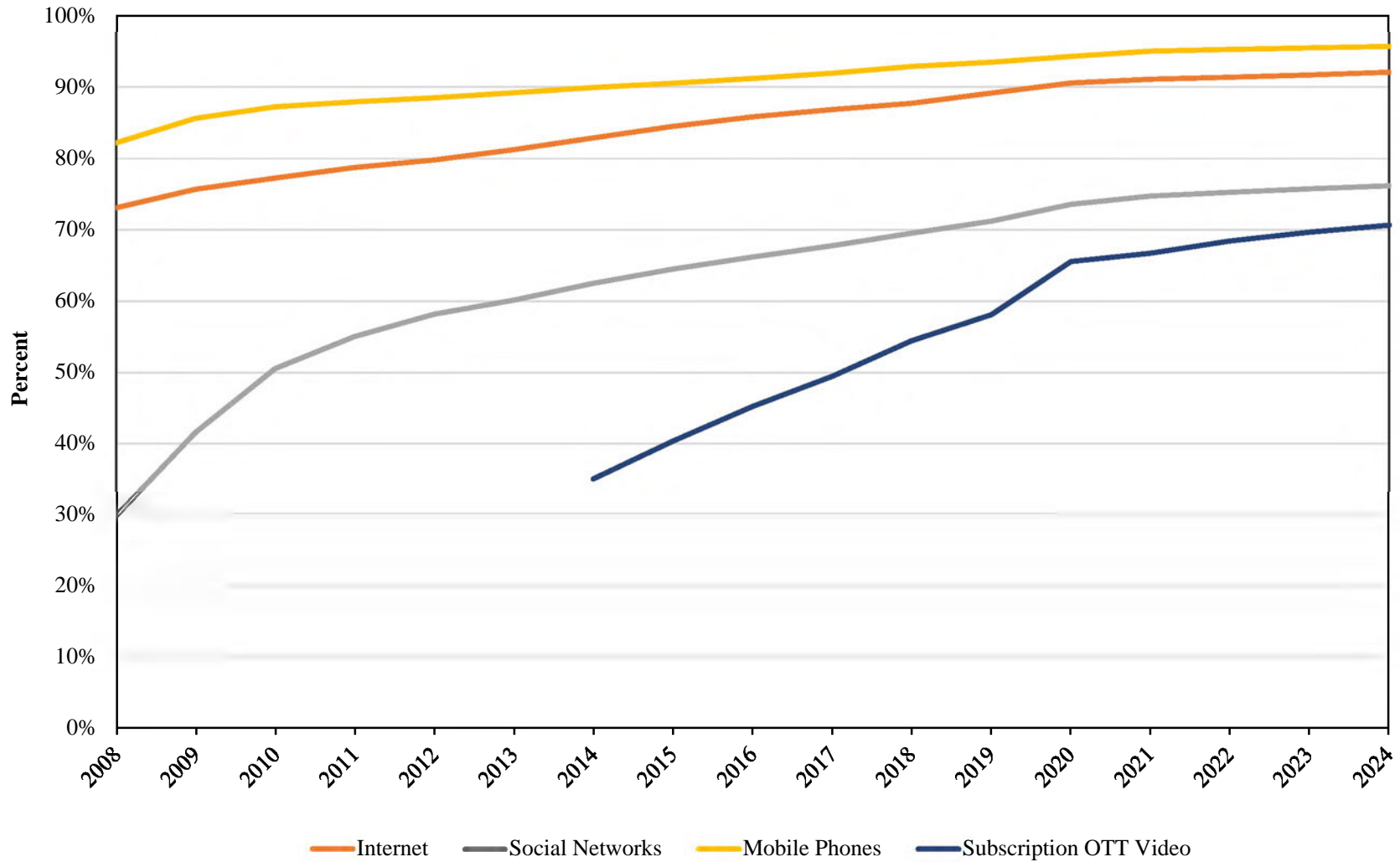
	<u>Publishers</u>	<u>Participation</u>
	-----(Count)----	----(Percent)----
	(a)	(b)
<b>Number of Distinct Publishers in Gans' Narrow Market</b>	<b>50,140</b>	<b>100.00 %</b>
Publishers who Only Sell Ads in Gans' Narrow Market	40,624	81.02
Publishers who Sell Ads Inside and Outside Gans' Narrow Market	9,516	18.98

Notes: Outside channels include ads purchased outside of Gans' narrow market plus direct deals. Publishers are considered to be using a channel if greater than 0.5 percent of their total impressions are on that channel. Prior to 2017, DFP Reservations data have undefined user\_device and is\_mobile\_app\_request fields.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 24**  
**Large Shares of the Adult Population Leverage Multiple Forms of Media**  
**2008-2024**

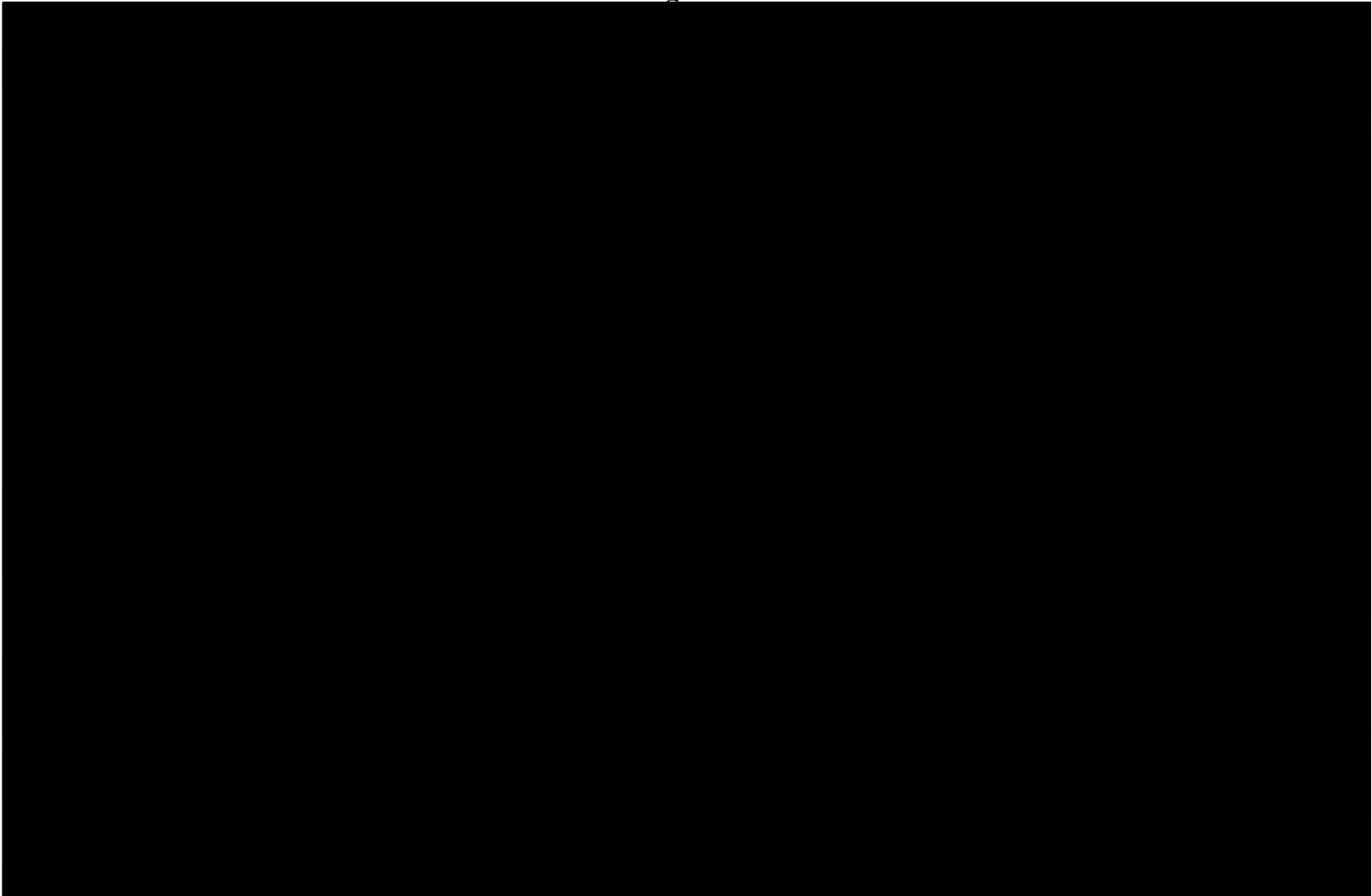


Notes: Categories are not necessarily mutually exclusive. Subscription OTT Video includes platforms such as Netflix, Hulu, and Disney+, among others.

Source: DOJ RFP 57 eMarketer Data - "U.S. Time Spent with Connected Devices."

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**Figure 25**

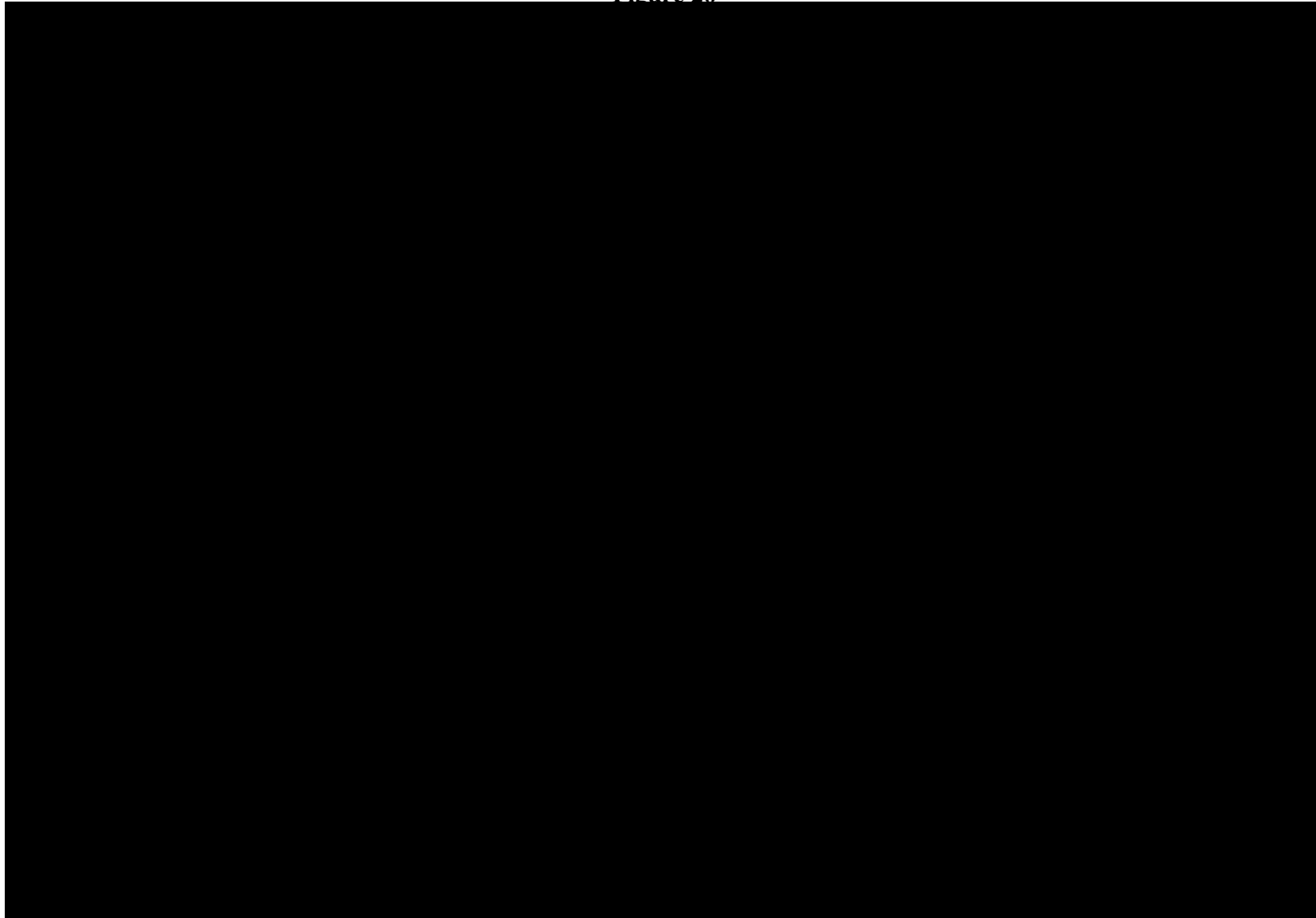


Notes: Advertisers are considered to be using a channel if greater than 0.5 percent of their total ad spend is on that channel.

Source: MDL DV360 XBridge Data; MDL RFP 243 Google Ads Data.

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**Figure 26**

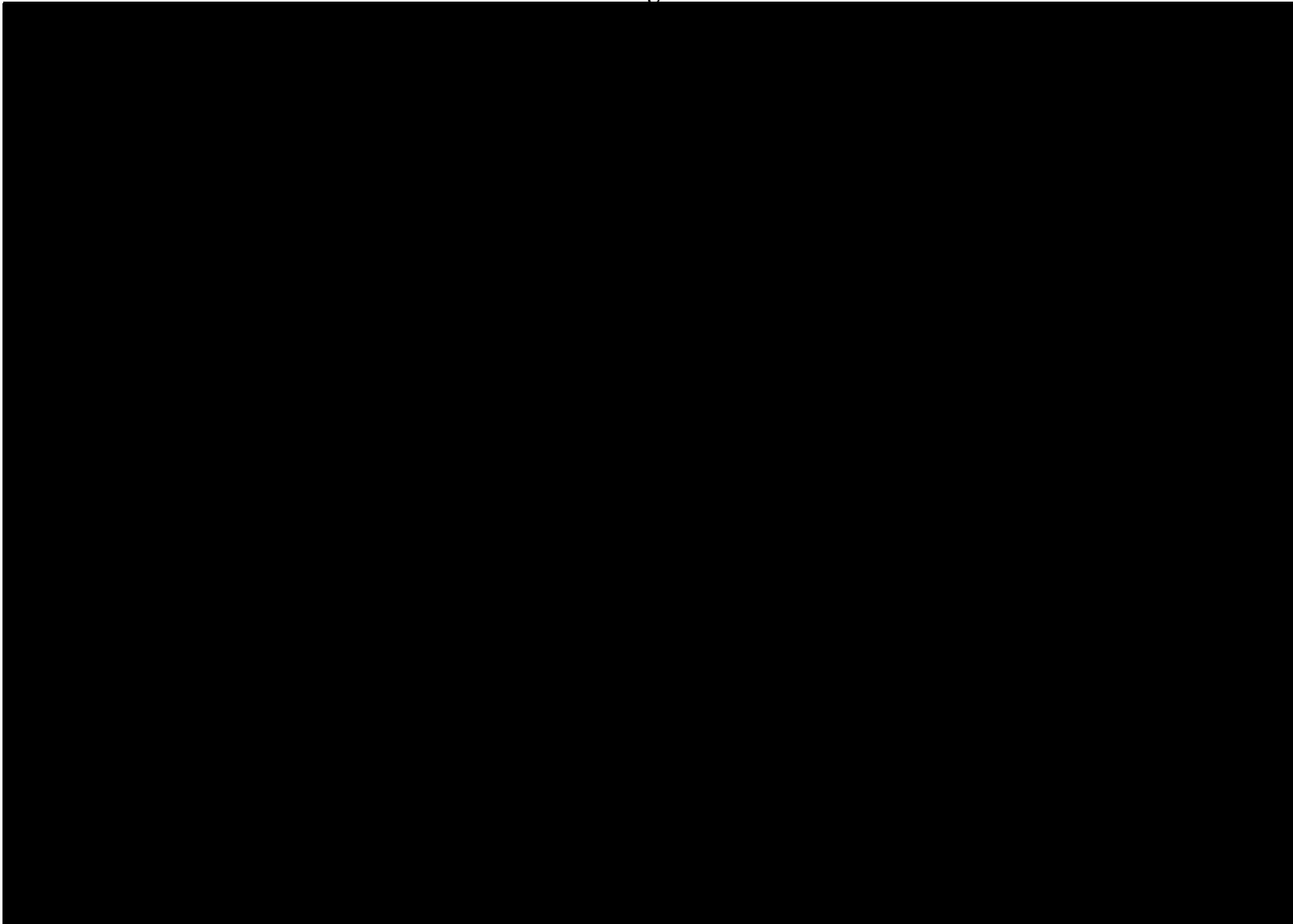


Notes: Advertisers are considered to be using a channel if greater than 0.5 percent of their total ad spend is on that channel.

Source: MDL DV360 XBridge Data; MDL RFP 243 Google Ads Data.

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**Figure 27**



Notes: Advertisers are considered to be using a channel if greater than 0.5 percent of their total ad spend is on that channel.

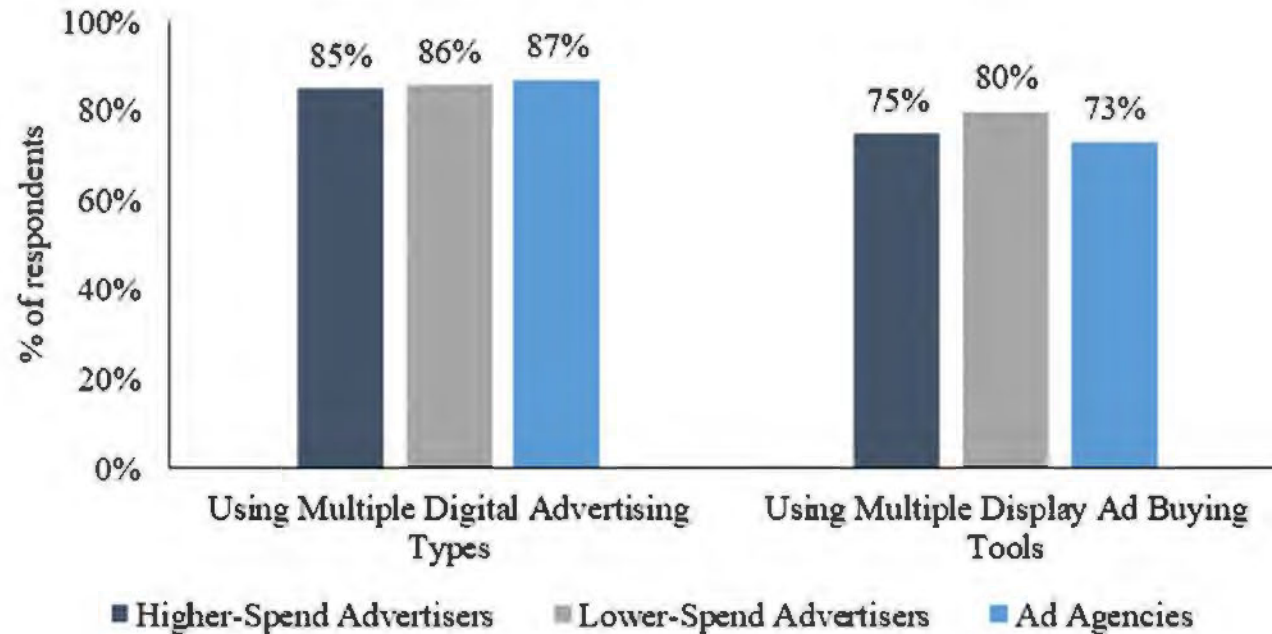
Source: MDL XP Daily Current Stats Data.

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**Figure 28**

**Reproduced Figure 4 from Simonson Report**

**Figure 4. Share of Respondents in Each Survey Multi-homing Across Different Types of Digital Advertising and Display Ad Buying Tools**



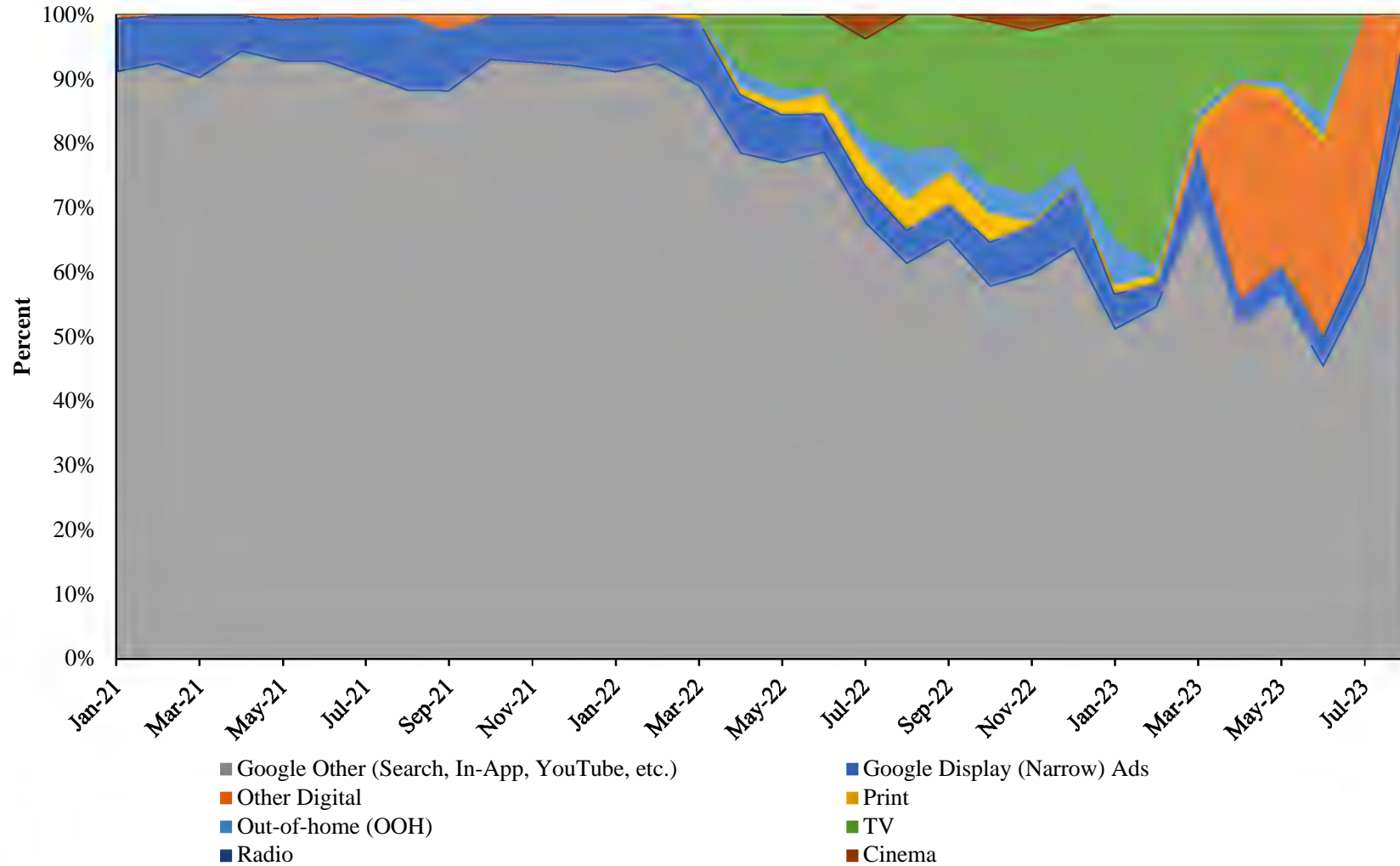
**Notes & Sources:** From Exhibits 9, 21, 45, 49, 76, and 87.

Source: See Simonson's Report. Figure 4



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**Figure 29**  
**Google as an Advertiser Uses a Variety of Advertising Channels**  
**January 2021 - August 2023**



Source: DOJ RFP 57 Camry Data.

Notes: Google Display (Narrow) spend is identified if buying platform was identified as “GDN - Display”, “DV360 - Open Exchange”.

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**Figure 30**  
**Count of U.S. Advertisers Inside and Outside of Display Ads (Narrow)**  
**July 2010 - June 2022**

	<b>Advertisers</b>	<b>Participation</b>
	<b>------(Count)-----</b>	<b>------(Percent)-----</b>
	<b>(a)</b>	<b>(b)</b>
<b>Advertisers Who Purchase Internet Display Advertising</b>	<b>45,581</b>	<b>100.00 %</b>
Advertisers who Only Buy Inside Internet Display Ads	19,931	43.73
Advertisers who Buy Inside and Outside Internet Display Ads	25,650	56.27

Notes: Advertisers are considered to be using a channel if greater than 0.5 percent of their advertiser spend is on that channel. Share of Wallet definition of internet display advertising may diverge from Plaintiffs' definition of display advertising.

Source: DOJ RFP 57 Share of Wallet Data.

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**Figure 31**  
**Reproduced Appendix Exhibit 44 from Simonson Report**  
**LOWER-SPEND ADVERTISER SURVEY**  
**TYPES OF DIGITAL ADVERTISING USED**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

QS12: Which of the following types of digital advertising, if any, have you used in the past year? Please review the description of each advertising type carefully. (Please select all that apply.)

Advertising Type	Total Respondents		< Than \$50K Ad Spend		\$50K – \$500K Ad Spend	
	#	%	#	%	#	%
[A]	[B]	[C]	[D]	[E]	[F]	[G]
[1] Display	243	100%	117	100%	126	100%
[2] Social	161	66%	80	68%	81	64%
[3] Search	151	62%	74	63%	77	61%
[4] Digital Video	119	49%	50	43%	69	55%
[5] Email	107	44%	39	33%	68	54%
[6] Digital Audio	93	38%	44	38%	49	39%
[7] eCommerce Platforms	90	37%	38	32%	52	41%
[8] App/In-App	83	34%	41	35%	42	33%
[9] Connected TV	79	33%	31	26%	48	38%
[10] Other	1	0%	-	0%	1	1%
[11] Total	243	100%	117	100%	126	100%

Notes & Sources:

From Lower-Spend Advertiser Survey.

Respondents who did not select “Display” were screened out of the survey.

Percentages do not add up to 100% because respondents can select multiple options.

Sorted in descending order based on column [B].

Source: Simonson Report, Appendix Exhibit 44.

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**Figure 32**  
**Reproduced Appendix Exhibit 45 from Simonson Report**

**LOWER-SPEND ADVERTISER SURVEY**  
**NUMBER OF TYPES OF DIGITAL ADVERTISING USED**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

QS12: Which of the following types of digital advertising, if any, have you used in the past year? Please review the description of each advertising type carefully. (Please select all that apply.)

Number of Types Selected	Total Respondents		< Than \$50K Ad Spend		\$50K – \$500K Ad Spend	
	#	%	#	%	#	%
[A]	[B]	[C]	[D]	[E]	[F]	[G]
[1] 1	40	16%	26	22%	14	11%
[2] 2	11	5%	5	4%	6	5%
[3] 3	50	21%	30	26%	20	16%
[4] 4	20	8%	6	5%	14	11%
[5] 5	34	14%	9	8%	25	20%
[6] 6	23	9%	8	7%	15	12%
[7] 7	23	9%	11	9%	12	10%
[8] 8	12	5%	4	3%	8	6%
[9] 9	30	12%	18	15%	12	10%
[10] 10	-	0%	-	0%	-	0%
[11] Total	243	100%	117	100%	126	100%

Notes & Sources:

From Lower-Spend Advertiser Survey.

Source: Simonson Report, Appendix Exhibit 45.

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**Figure 33**  
**Reproduced Appendix Exhibit 8 from Simonson Report**

**HIGHER-SPEND ADVERTISER SURVEY**  
**TYPES OF DIGITAL ADVERTISING USED**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

QS12: Which of the following types of digital advertising, if any, have you used in the past year? Please review the description of each advertising type carefully. (Please select all that apply.)

Advertising Type	Total Respondents	
	#	%
[A]	[B]	[C]
[1] Display	453	100%
[2] Social	347	77%
[3] Search	347	77%
[4] Digital Video	292	64%
[5] Email	282	62%
[6] eCommerce Platforms	242	53%
[7] Connected TV	204	45%
[8] App/In-App	195	43%
[9] Digital Audio	178	39%
[10] Other	2	0%
[11] Total	453	100%

Notes & Sources:

From Higher-Spend Advertiser Survey.

Respondents who did not select "Display" were screened out of the survey.

Percentages do not add up to 100% because respondents can select multiple options.

Sorted in descending order based on column [B], except for "Other."

Source: Simonson Report, Appendix Exhibit 8.

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**Figure 34**  
**Reproduced Appendix Exhibit 9 from Simonson Report**

**HIGHER-SPEND ADVERTISER SURVEY**  
**NUMBER OF TYPES OF DIGITAL ADVERTISING USED**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

QS12: Which of the following types of digital advertising, if any, have you used in the past year? Please review the description of each advertising type carefully. (Please select all that apply.)

	Number of Types Selected	Total Respondents	
		#	%
	[A]	[B]	[C]
[1]	1	66	15%
[2]	2	9	2%
[3]	3	14	3%
[4]	4	40	9%
[5]	5	63	14%
[6]	6	75	17%
[7]	7	64	14%
[8]	8	57	13%
[9]	9	63	14%
[10]	10	2	0%
[11]	Total	453	100%

Notes & Sources:

From Higher-Spend Advertiser Survey.

Source: Simonson Report, Appendix Exhibit 9.



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**Figure 35**  
**Reproduced Appendix Exhibit 10 from Simonson Report**

**HIGHER-SPEND ADVERTISER SURVEY**  
**DISPLAY ADVERTISING TRANSACTION METHODS**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

QS13: Which of the following transaction methods has your business unit/team  
(or your ad agency) used to purchase display ad inventory in the past year?  
(Please select all that apply.)

Transaction Method	Total Respondents	
	#	%
[A]	[B]	[C]
[1] Programmatic Only	195	43%
[2] Programmatic and Direct Deals	258	57%
[3] Total	453	100%

Notes & Sources:

From Higher-Spend Advertiser Survey.

Respondents who selected “Direct Deals Only,” “None of the Above” or  
“Don’t know / Unsure” were screened out of the survey.

Source: Simonson Report, Appendix Exhibit 10.

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**Figure 36**  
**Reproduced Appendix Exhibit 75 from Simonson Report**  
**AGENCY SURVEY**  
**TYPES OF DIGITAL ADVERTISING USED**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

QS14: Which of the following types of digital advertising, if any, have you used in the past year for the client you spend the most time on? Please review the description of each advertising type carefully. (Please select all that apply.)

Advertising Type	Total Respondents	
	#	%
[A]	[B]	[C]
[1] Display	331	100%
[2] Social	255	77%
[3] Search	233	70%
[4] Digital Video	215	65%
[5] Connected TV	168	51%
[6] Email	161	49%
[7] eCommerce Platforms	151	46%
[8] App/In-App	141	43%
[9] Digital Audio	139	42%
[10] Other	2	1%
[11] Total	331	100%

Notes & Sources:

From Agency Survey.

Respondents who did not select "Display" were screened out of the survey.

Percentages do not add up to 100% because respondents can select multiple options.

Sorted in descending order based on column [B], except for "Other."

Source: Simonson Report, Appendix Exhibit 75.



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**Figure 37**  
**Reproduced Appendix Exhibit 76 from Simonson Report**  
**AGENCY SURVEY**  
**NUMBER OF TYPES OF DIGITAL ADVERTISING USED**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

QS14: Which of the following types of digital advertising, if any, have you used in the past year for the client you spend the most time on? Please review the description of each advertising type carefully. (Please select all that apply.)

	Number of Types Selected	Total Respondents	
		#	%
	[A]	[B]	[C]
[1]	1	45	14%
[2]	2	10	3%
[3]	3	17	5%
[4]	4	35	11%
[5]	5	51	15%
[6]	6	44	13%
[7]	7	49	15%
[8]	8	42	13%
[9]	9	38	11%
[10]	10	-	0%
[11]	Total	331	100%

Notes & Sources:  
From Agency Survey.

Source: Simonson Report, Appendix Exhibit 76.

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**Figure 38**  
**Reproduced Appendix Exhibit 77 from Simonson Report**

**AGENCY SURVEY**  
**DISPLAY ADVERTISING TRANSACTION METHODS**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

QS15: Which of the following transaction methods have you used to purchase display ad inventory in the past year for the client you spend the most time on? (Please select all that apply.)

Transaction Method	Total Respondents	
	#	%
[A]	[B]	[C]
[1] Programmatic Only	177	53%
[2] Programmatic and Direct Deals	154	47%
[3] Total	331	100%

Notes & Sources:

From Agency Survey.

Respondents who selected “Direct Deals Only,” “None of the Above,” or “Don’t know / Unsure” were screened out of the survey.

Source: Simonson Report, Appendix Exhibit 77.

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**Figure 39**  
**Reproduced Appendix Exhibit 58 from Simonson Report**  
**LOWER-SPEND ADVERTISER SURVEY**  
**RESPONSE TO DISPLAY COST INCREASE**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q9: Now suppose that, based on your analysis, the cost of display advertising has recently increased by a small but significant amount, and will remain elevated for the foreseeable future. Assume further that, based on similar analyses for other digital advertising types, the costs of other digital advertising types have not changed and are not expected to change. So if the cost of display advertising increases (while the cost of other advertising types remains the same), will you or won't you divert some of your advertising spending for the coming year to other types of digital advertising?

Response Options	Total Respondents		< Than \$50K Ad Spend		\$50K – \$500K Ad Spend	
	#	%	#	%	#	%
[A]	[B]	[C]	[D]	[E]	[F]	[G]
[1] Will Divert Spending	143	59%	81	69%	62	49%
[2] Will Not Divert Spending	87	36%	33	28%	54	43%
[3] Don't know / Unsure	13	5%	3	3%	10	8%
[4] Total Shown Question	243	100%	117	100%	126	100%

Notes & Sources:

From Lower-Spend Advertiser Survey.

Source: Simonson Report, Appendix Exhibit 58.

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**Figure 40**  
**Reproduced Appendix Exhibit 59 from Simonson Report**  
**LOWER-SPEND ADVERTISER SURVEY**  
**ADVERTISING TYPES TO WHICH SPENDING WOULD BE DIVERTED**  
**DUE TO DISPLAY COST INCREASE**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q10: To which other types of digital advertising below, if any, would you divert your advertising spending for the coming year as a result of the increase in the cost of display advertising?

Advertising Type	Respondents Indicating They Would Divert Spending to the Advertising Type					
	Total Respondents		< Than \$50K Ad Spend		\$50K – \$500K Ad Spend	
	#	%	#	%	#	%
[A]	[B]	[C]	[D]	[E]	[F]	[G]
[1] Social	84	59%	53	65%	31	50%
[2] Email	60	42%	27	33%	33	53%
[3] Search	60	42%	33	41%	27	44%
[4] Digital Video	54	38%	30	37%	24	39%
[5] Digital Audio	53	37%	25	31%	28	45%
[6] eCommerce Platforms	47	33%	26	32%	21	34%
[7] App/In-app	38	27%	20	25%	18	29%
[8] Connected TV	37	26%	15	19%	22	35%
[9] Other	1	1%	-	0%	1	2%
[10] None of the above	-	0%	-	0%	-	0%
[11] Don't know / Unsure	-	0%	-	0%	-	0%
[12] Total Shown Question	143	100%	81	100%	62	100%

Notes & Sources:

From Lower-Spend Advertiser Survey.

Sorted in descending order based on column [B], except for "Other," "None of the above," and "Don't know/Unsure."

Respondents can hover their mouse over each digital advertising type to review the type description.

Percentages do not add up to 100% because respondents can select multiple options.

Respondents were only shown Q10 if they indicated that they would divert advertising spending to other types of digital advertising in Q9.

Source: Simonson Report, Appendix Exhibit 59.

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**Figure 41**  
**Reproduced Appendix Exhibit 15 from Simonson Report**  
**HIGHER-SPEND ADVERTISER SURVEY**  
**RESPONSE TO PROGRAMMATIC DISPLAY COST INCREASE**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q5: Now suppose that, based on your analysis, the cost of programmatic display advertising has recently increased by a small but significant amount, and will remain elevated for the foreseeable future. Assume further that, based on similar analyses for other digital advertising types, the costs of other digital advertising types have not changed and are not expected to change. So if the cost of programmatic display advertising increases (while the cost of other advertising types remains the same), will you or won't you divert some of your advertising spending for the coming year to other types of digital advertising?

	Response Options	#	%
	[A]	[B]	[C]
[1]	Will Divert Spending	262	58%
[2]	Will Not Divert Spending	164	36%
[3]	Don't know / Unsure	27	6%
[4]	Total Shown Question	453	100%

Notes & Sources:

From Higher-Spend Advertiser Survey.

Source: Simonson Report, Appendix Exhibit 15.



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**Figure 42**  
**Reproduced Appendix Exhibit 16 from Simonson Report**  
**HIGHER-SPEND ADVERTISER SURVEY**  
**ADVERTISING TYPES TO WHICH SPENDING WOULD BE DIVERTED**  
**DUE TO PROGRAMMATIC DISPLAY COST INCREASE**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q6: To which other types of digital advertising below, if any, would you divert your advertising spending for the coming year as a result of the increase in the cost of programmatic display advertising?

Advertising Type [A]	Respondents Indicating They Would Divert Spending to the Advertising Type	
	# [B]	% [C]
[1] Social	143	55%
[2] Search	140	53%
[3] Digital Video	109	42%
[4] Direct Deals Display	85	32%
[5] eCommerce Platforms	84	32%
[6] Email	81	31%
[7] Connected TV	80	31%
[8] App/In-App	67	26%
[9] Digital Audio	59	23%
[10] Other	2	1%
[11] None of the above	1	0%
[12] Don't know / Unsure	4	2%
[13] Total Shown Question	262	100%

Notes & Sources:

From Higher-Spend Advertiser Survey.

Sorted in descending order based on column [B], except for "Other," "None of the above," and "Don't know / Unsure."

Respondents can hover their mouse over each digital advertising type to review the advertising type description.

Percentages do not add up to 100% because respondents can select multiple options.

Respondents were only shown Q6 if they indicated in Q5 that they would divert advertising spending to other types of digital advertising.

Source: Simonson Report, Appendix Exhibit 16.

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**Figure 43**  
**Reproduced Appendix Exhibit 81 from Simonson Report**  
**AGENCY SURVEY**  
**RESPONSE TO PROGRAMMATIC DISPLAY COST INCREASE**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q4: Now suppose that, based on your analysis, the cost of programmatic display advertising has recently increased by a small but significant amount, and will remain elevated for the foreseeable future. Assume further that, based on similar analyses for other digital advertising types, the costs of other digital advertising types have not changed and are not expected to change. So, for the client you spend the most time on, if the cost of programmatic display advertising increases (while the cost of other advertising types remains the same), will you or won't you divert some of your advertising spending for the coming year for the client you spend the most time on to other types of digital advertising?

	Response Options	#	%
	[A]	[B]	[C]
[1]	Will Divert Spending	185	56%
[2]	Will Not Divert Spending	132	40%
[3]	Don't know / Unsure	14	4%
[4]	Total Shown Question	331	100%

Notes & Sources:  
From Agency Survey.

Source: Simonson's Report, Appendix Exhibit 81.

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**Figure 44**  
**Reproduced Appendix Exhibit 82 from Simonson Report**

**AGENCY SURVEY**  
**ADVERTISING TYPES TO WHICH SPENDING WOULD BE DIVERTED**  
**DUE TO PROGRAMMATIC DISPLAY COST INCREASE**

Q5: To which other types of digital advertising below, if any, would you divert your advertising spending for the coming year for the client you spend the most time on, as a result of the increase in the cost of programmatic display advertising?

Advertising Type	Respondents Indicating They Would Divert Spending to the Advertising Type	
	#	%
[A]	[B]	[C]
[1] Social	113	61%
[2] Search	81	44%
[3] Digital Video	74	40%
[4] eCommerce Platforms	64	35%
[5] Connected TV	64	35%
[6] Direct Deals Display	62	34%
[7] Email	44	24%
[8] Digital Audio	41	22%
[9] App/In-app	38	21%
[10] Other	1	1%
[11] None of the above	1	1%
[12] Don't know / Unsure	1	1%
[13] Total Shown Question	185	100%

Notes & Sources:

From Agency Survey.

Sorted in descending order based on column [B], except for "Other," "None of the above," and "Don't know / Unsure."

Respondents can hover their mouse over each digital advertising type to review the advertising type description.

Percentages do not add up to 100% because respondents can select multiple options.

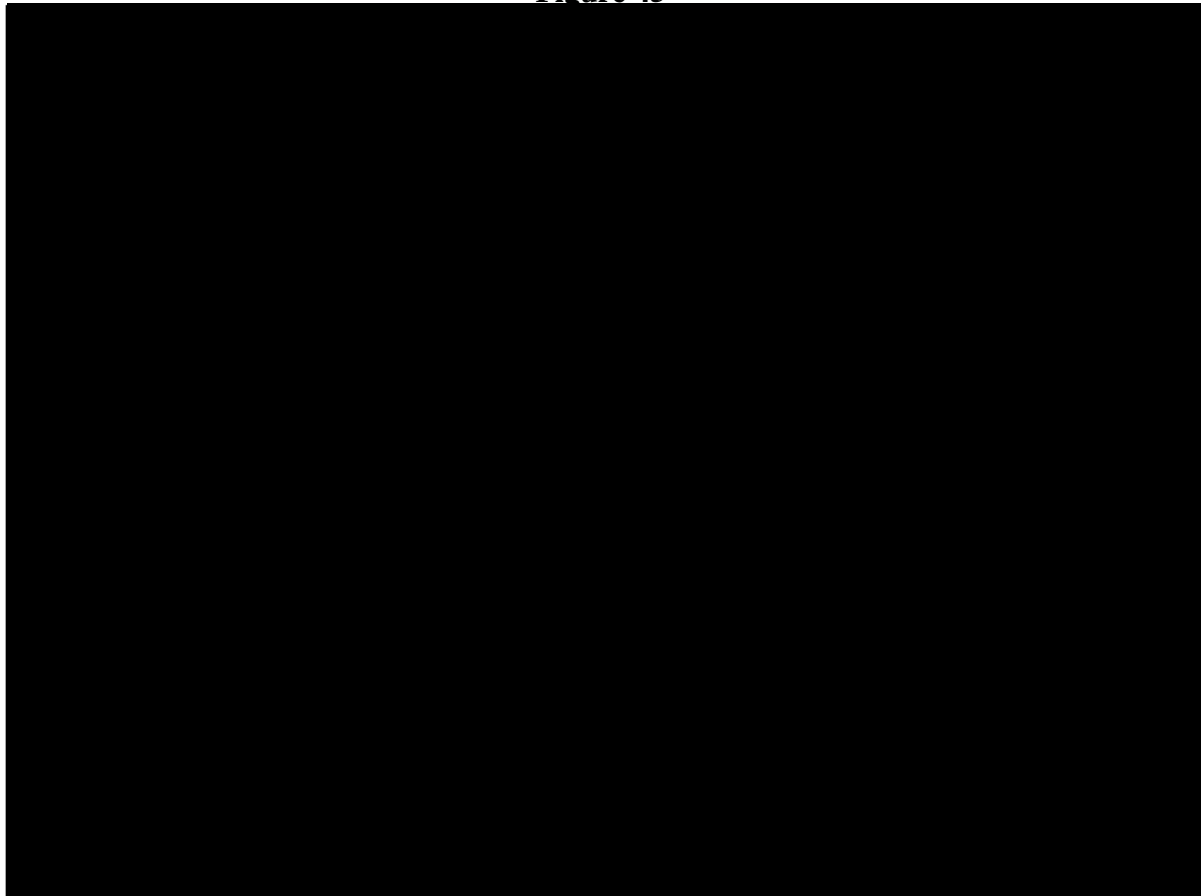
Respondents were only shown Q5 if they indicated in Q4 that they would divert advertising spending to other types of digital advertising for the client they spending the most time on.

Source: Simonson Report, Appendix Exhibit 82.



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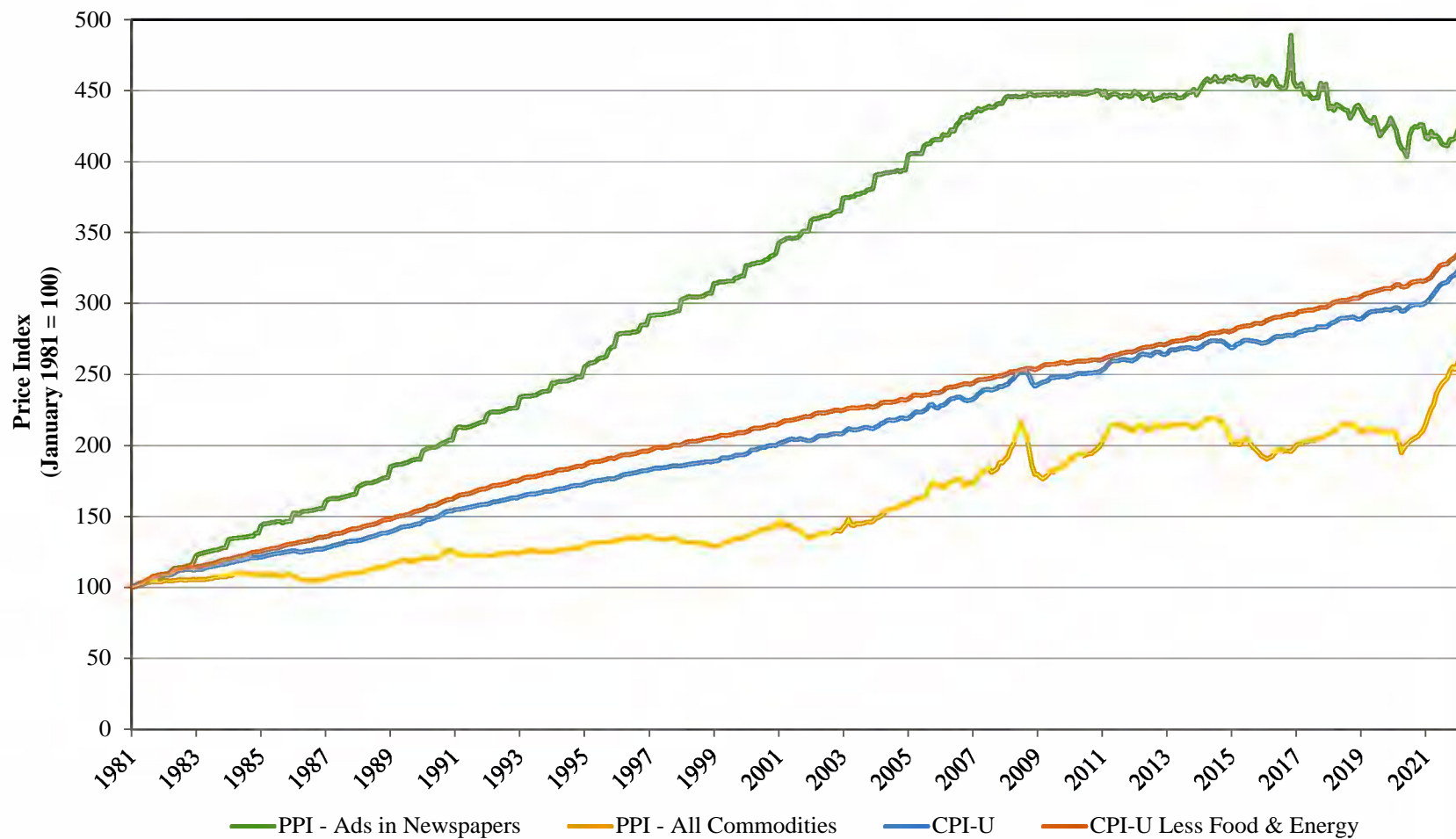
**Figure 45**



Source: DOJ RFP 57 DFP Fees Data.

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**Figure 46**  
**PPI for Ads in Newspapers vs. Other Price Measures**  
**January 1981 - April 2022**

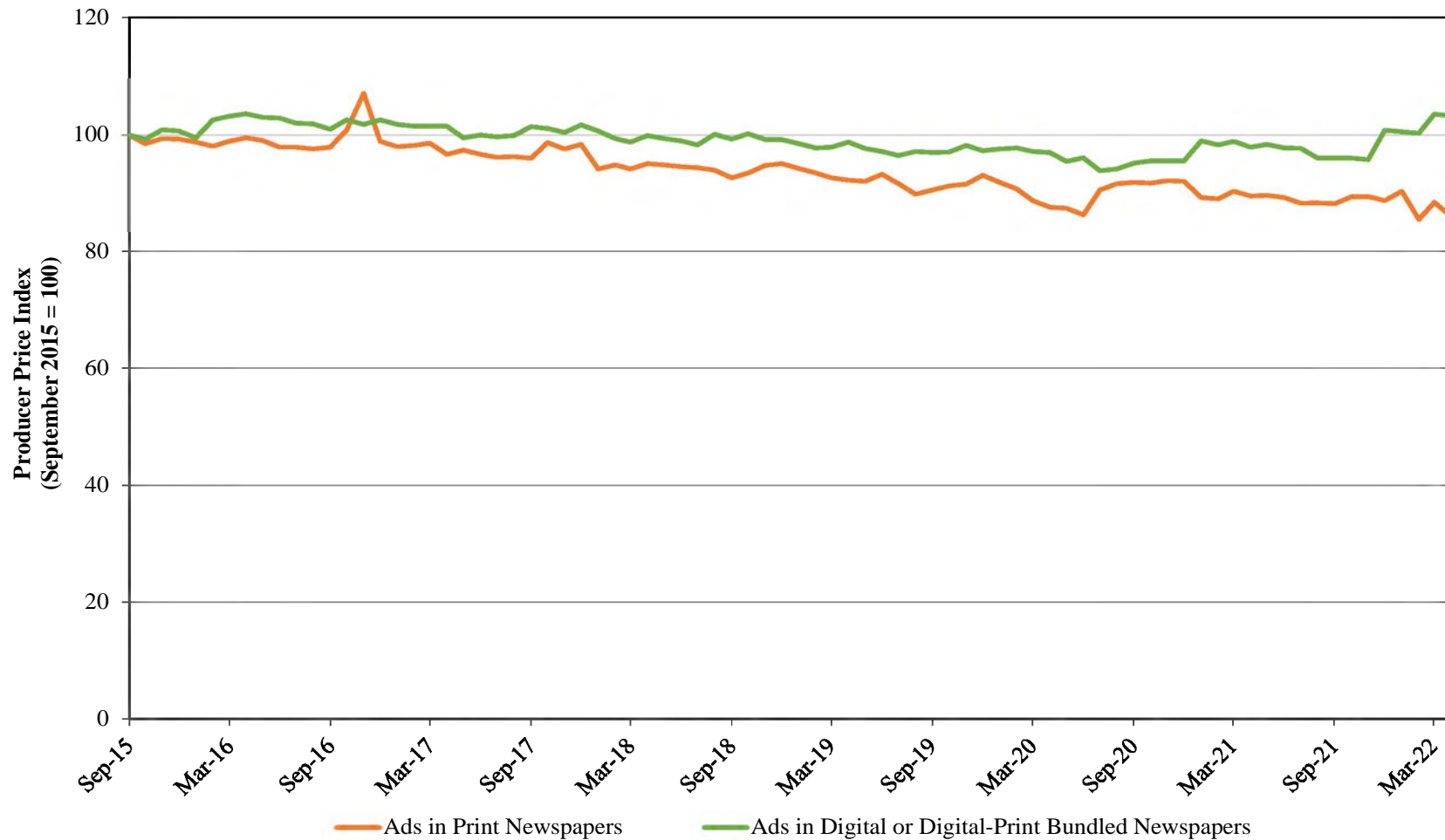


Notes: Advertising PPIs measure the average relative change in prices received by U.S. publishers for their ad inventory. Consumer price index CPI-U represents average changes to the cost of living for urban consumers. The newspaper ad and all commodities PPI series are based on the BLS commodity survey. Series have not been seasonally adjusted but have been re-indexed to the common base period of January 1981.

Source: Bureau of Labor Statistics Price Index Data.

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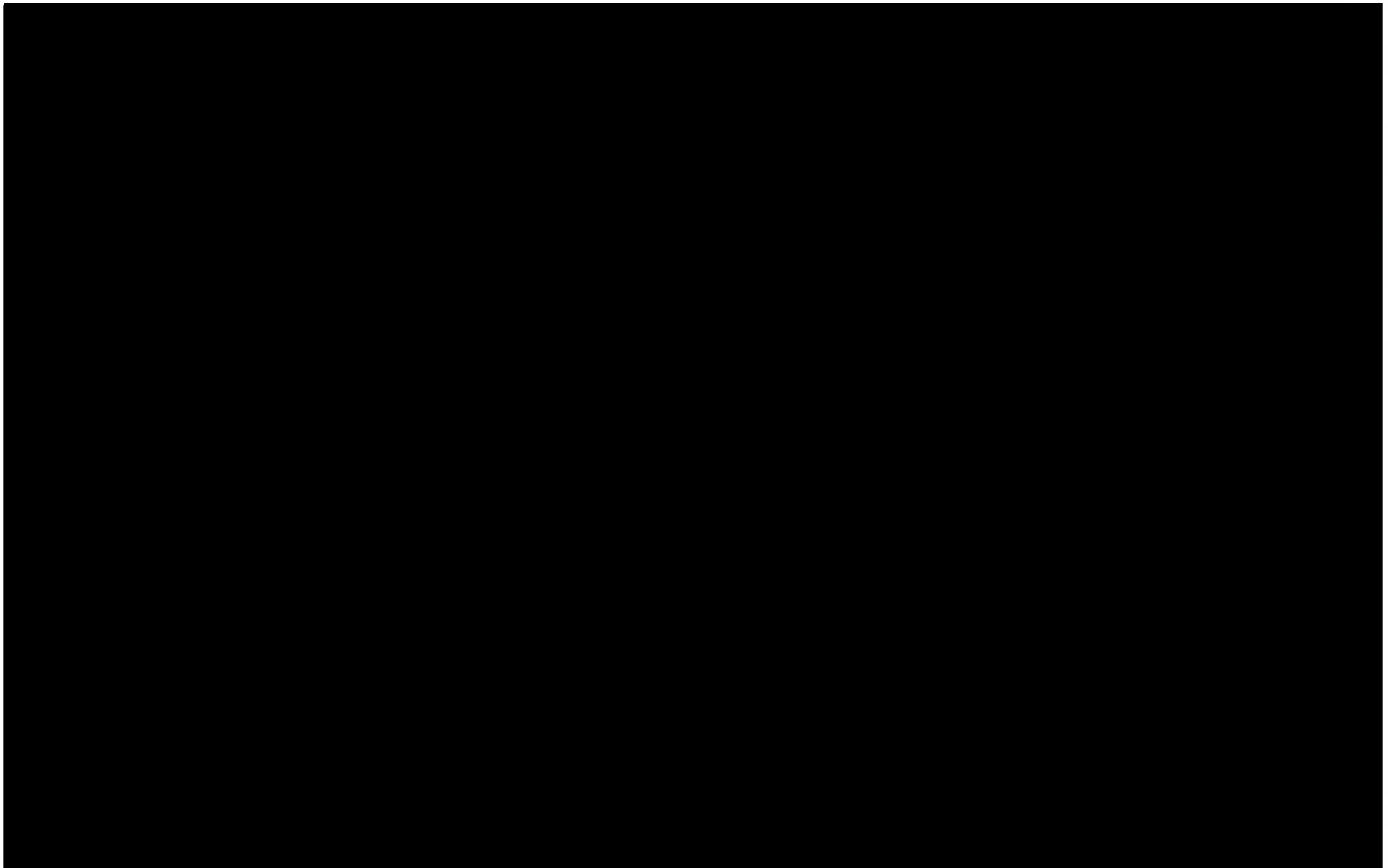
**Figure 47**  
**PPI for Ads in Print vs. Digital Newspapers**  
**September 2015 - April 2022**



Notes: Advertising PPIs measure the average relative change in prices received by U.S. publishers for their ad inventory. Both series are based on the BLS commodity survey, which classifies goods and services based on their intended use without regard for the producing industry. Series have not been seasonally adjusted and are indexed to their original base period.

Source: Bureau of Labor Statistics Price Index Data.

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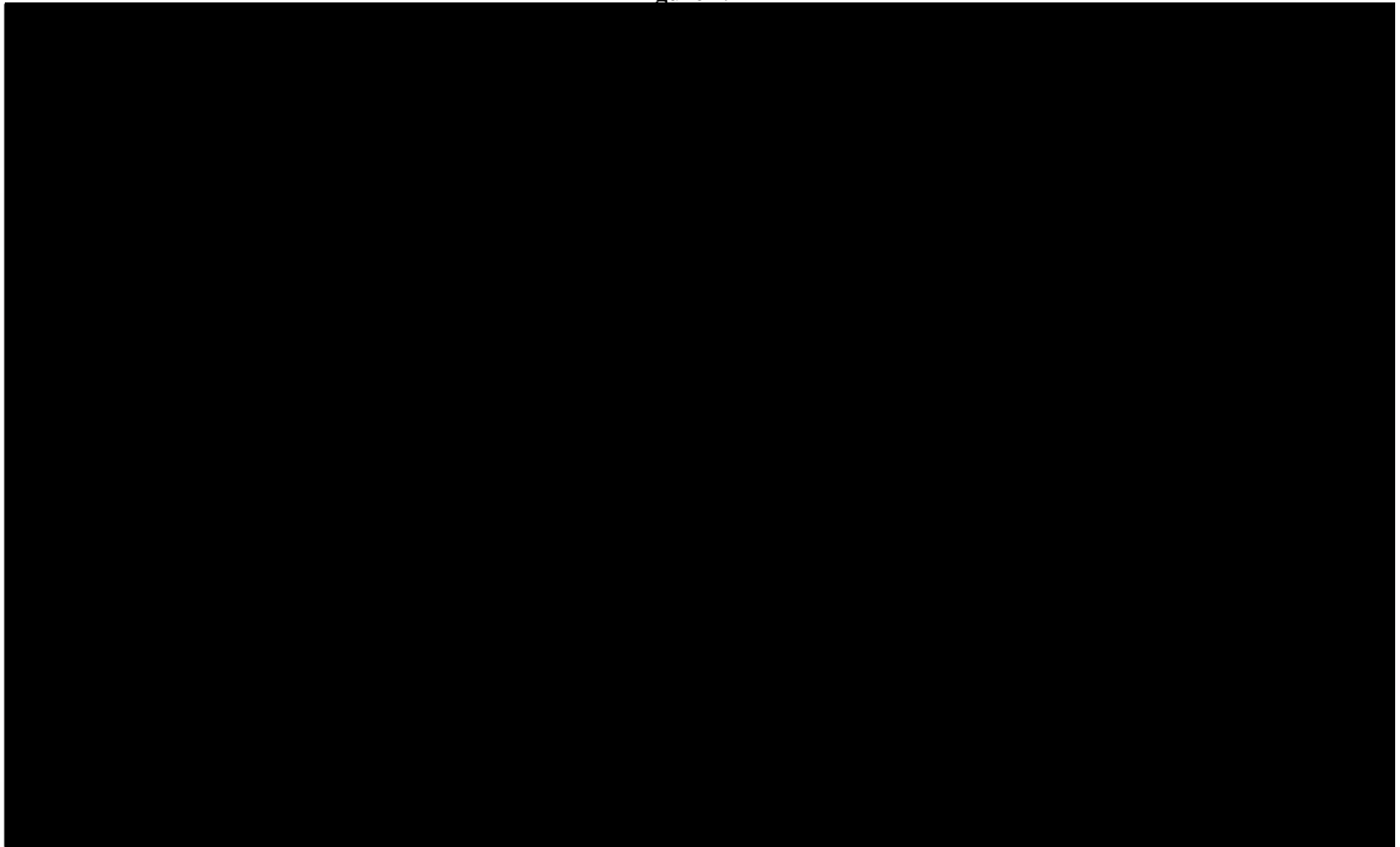


Notes: Conversions represent the number of times a user performed a particular action after seeing or clicking on an ad. Actions that would be considered a conversion depend on the advertiser and may include a sale, an appointment, a store visit, a phone call, a download, etc.

Source: DOJ RFP 57 Autobidding Data.

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**Figure 49**

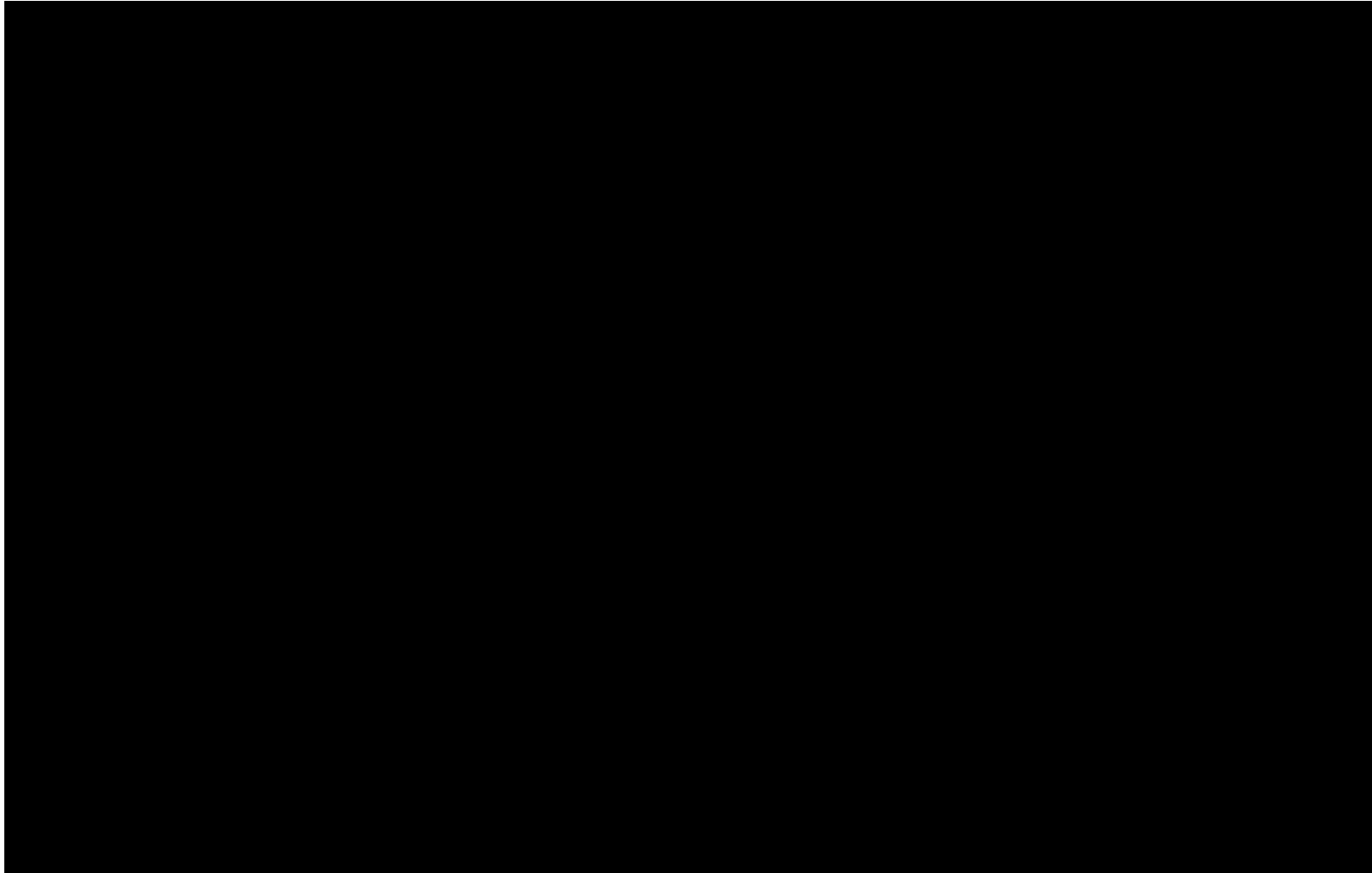


Notes: Prior to 2017, DFP Reservations data have undefined user\_device and is\_mobile\_app\_request fields.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 50**

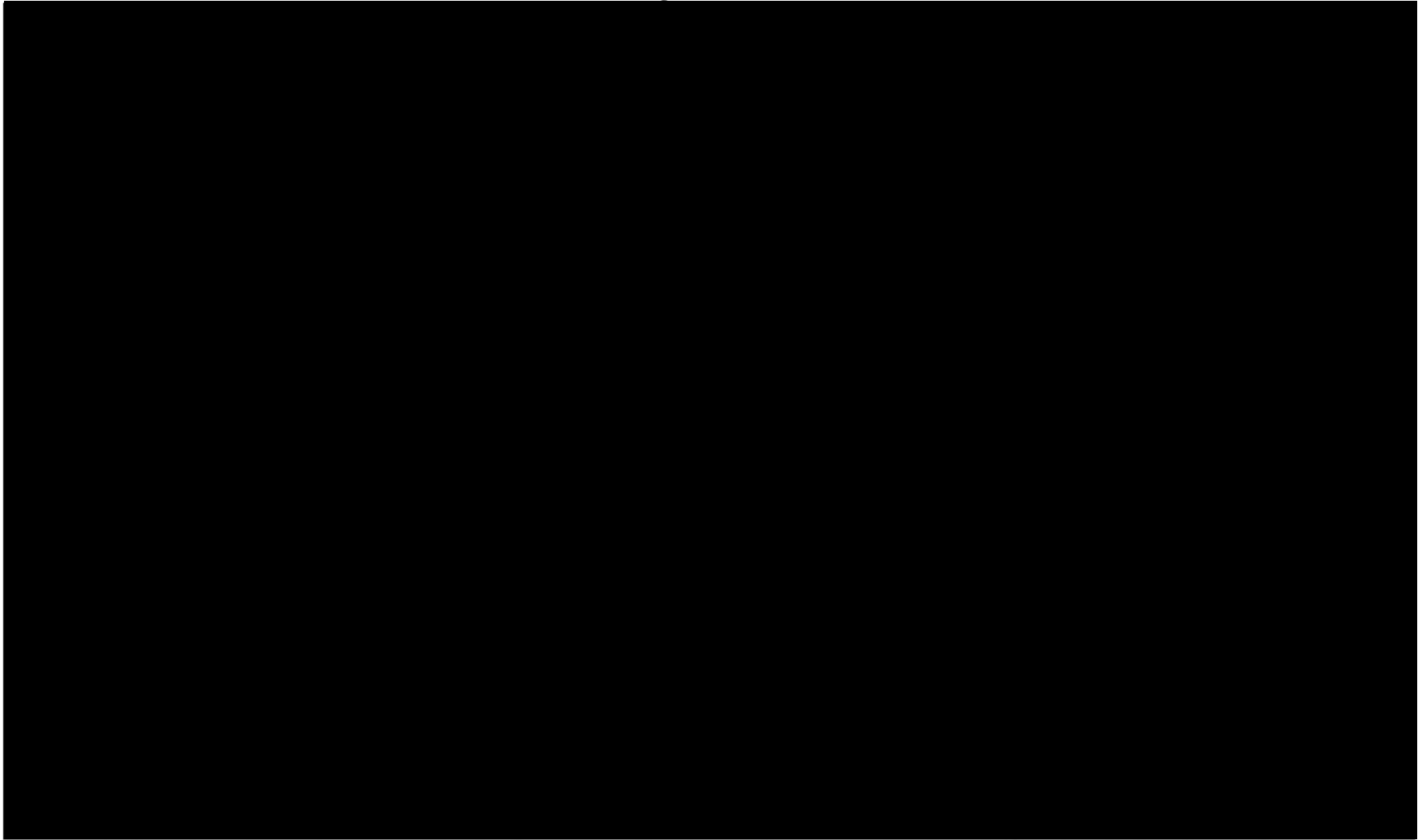


Notes: Limited to U.S. publishers and selected transaction types observed in the data. Before July 8, 2014 Google did not record gross revenue data. *See* GOOG-AT-MDL-008932468, at -471.

Source: MDL RFP 243 AdX Data.

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**Figure 51**



Notes: Google Ad Manager fees are calculated for invoiced units where fee bucket is "Display" or "DRM: Advanced Display". Data do not allow to disaggregate fees charged for mobile ads from narrow display ads

Source: DOJ RFP 57 DFP Fees Data.

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**Figure 52**  
**Advertisers Multi-Home Across Google's Buying Tools and Third-Party Buying Tools**  
**Limited to Display Ads (Narrow) Shown by U.S. Publishers**  
**August 2015 - June 2023**

	<u>Number of</u> <u>Advertisers</u> (a)
Advertisers Who Multi-Home with Google Ads and One or More Third-Party Buying Tools	16,188
Advertisers Who Multi-Home with Google Ads and...	
Microsoft	11,201
Nextroll	9,929
The Trade Desk	9,872
Criteo	9,845
Simpli.Fi	8,748
Linkedin RtB	7,964
Mediamath	7,668
Basis Technologies	6,469
Adform	6,405
Amazon	5,638
Zemanta	5,164
Yahoo	4,996
Bidswitch	4,758
Paperg	4,711
Quantcast	4,164
Datapoint Media	3,964
Yandex	3,935
Marin Display Bidder	3,655
Dataxu	3,337
Stackadapt Usd	3,331
Rtb House	3,264
Nexxen	3,213
Beeswax	2,889
Magnite	2,484
Solocal	2,295
Twenga	2,176
Echosearch	2,144
Maxpoint Interactive	1,964
Eyereturn	1,933
Wider Planet	1,913

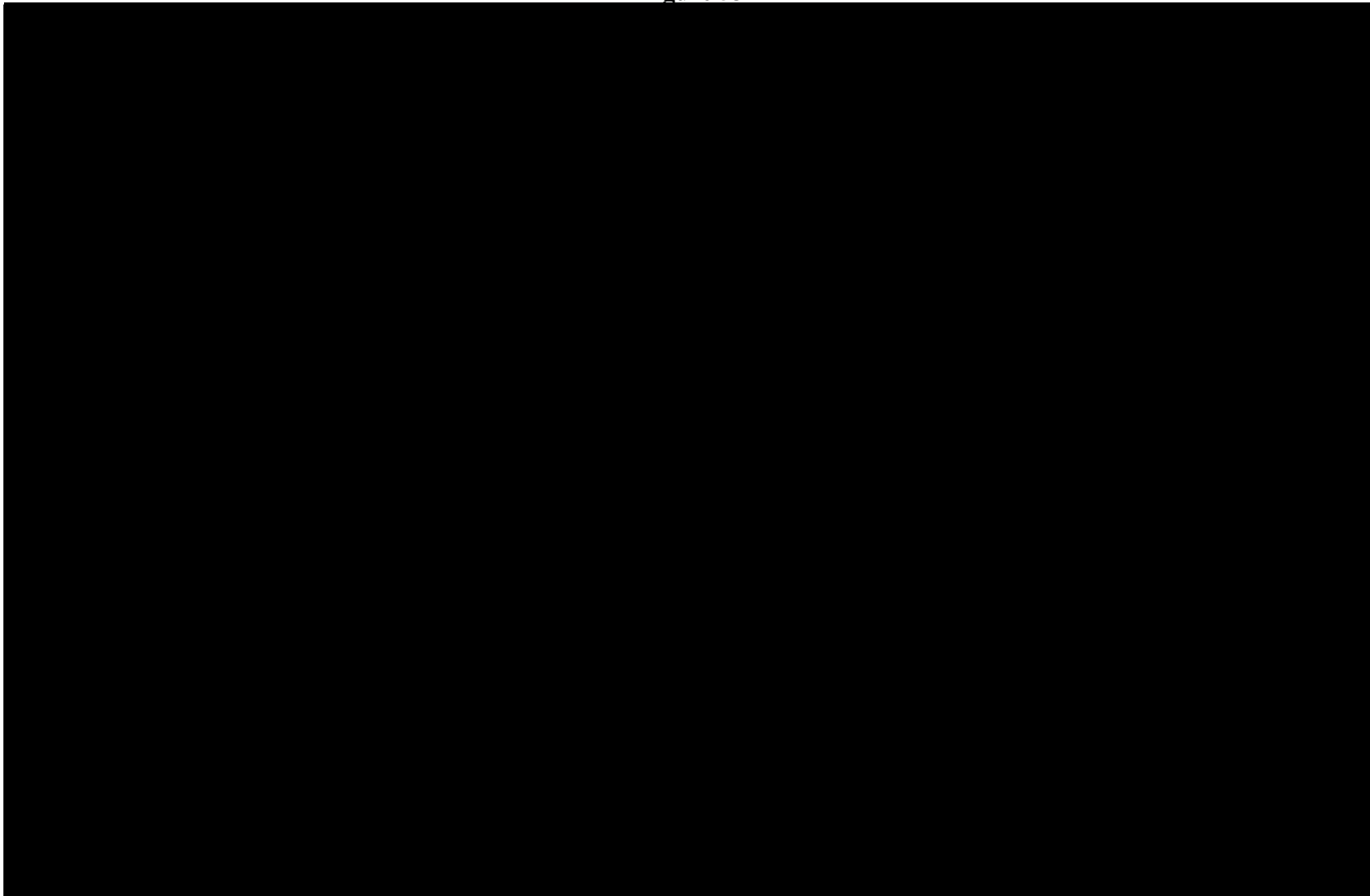
Notes: Observations with ad source type "No Ad", advertiser ID "0", or buyer network ID "0" have been excluded. Advertisers with 0 or less ad spend on narrow display ads have been excluded.

Source: DOJ RFP 57 DRX Internal Stats Data.



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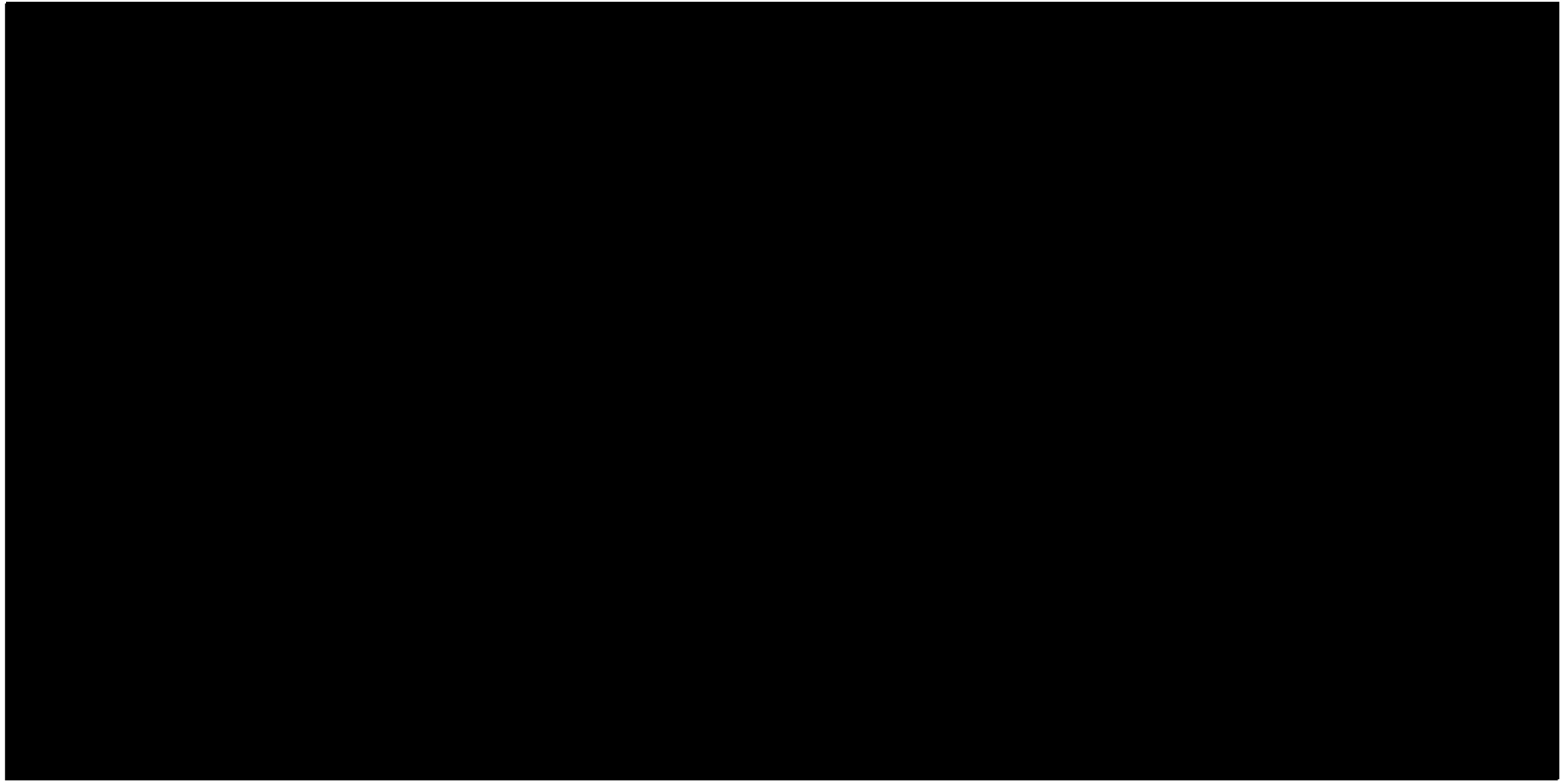
**Figure 53**



Notes: Advertisers without positive ad spend on narrow display ads have been excluded.

Source: DOJ RFP 57 DRX Internal Stats Data.

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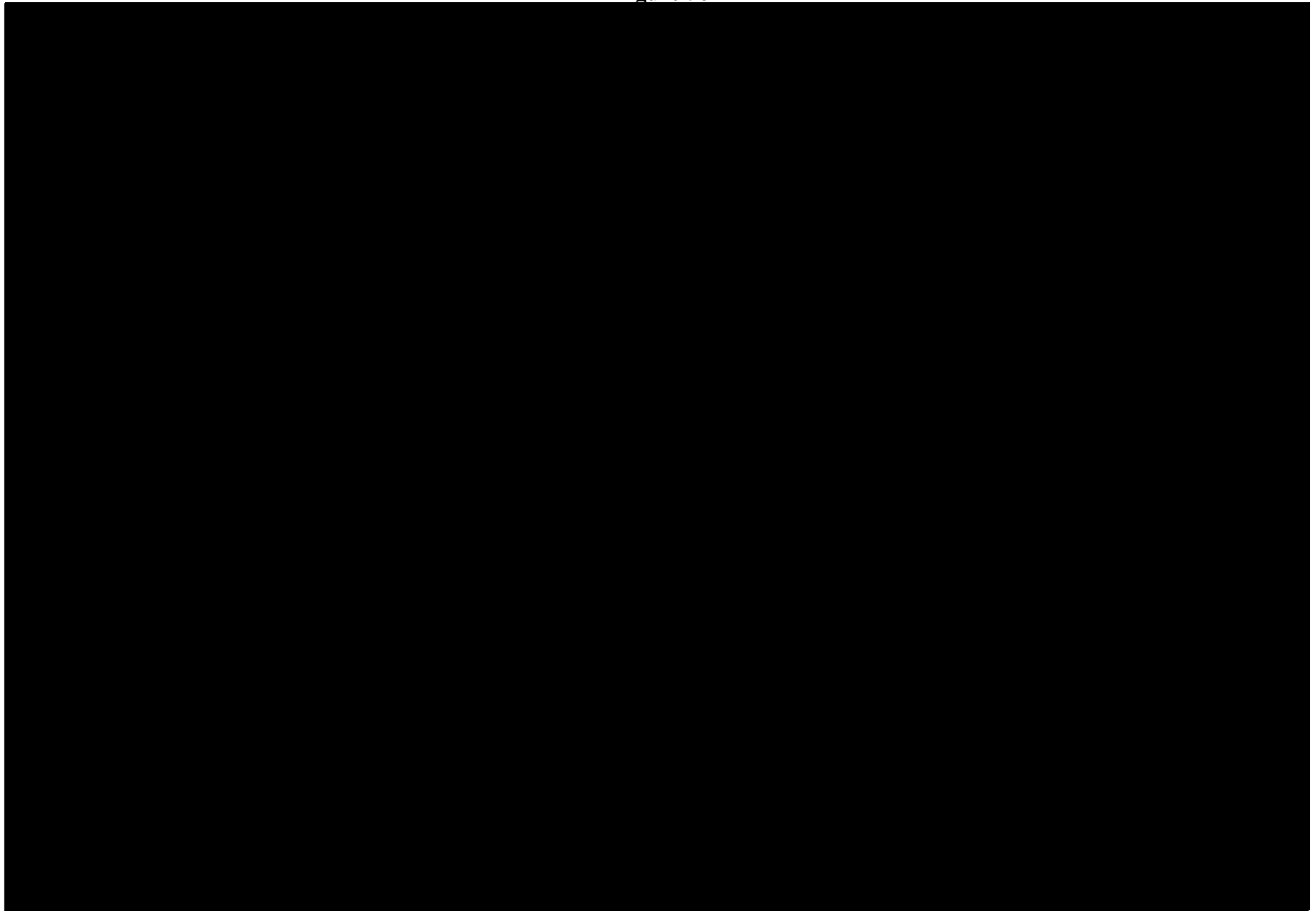
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**Figure 55**



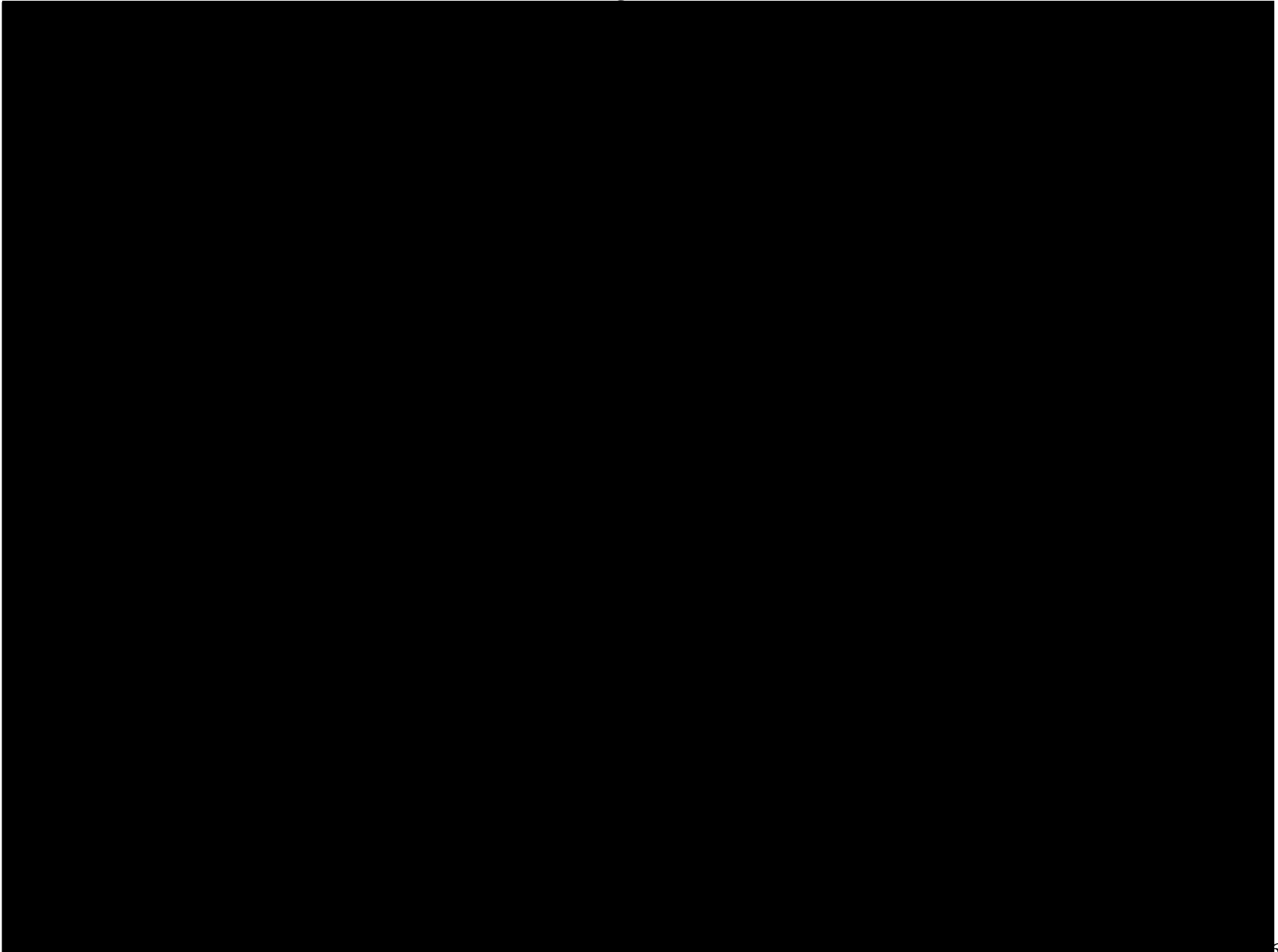
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**Figure 56**



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**Figure 57**



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**Figure 58**  
**Count of AdX and DFP Publishers Selling Display Ads (Narrow)**  
**Viewed by U.S. Users through Exchanges**  
**By Whether Publishers Sell Ads on Other Channels**  
**January 2017 - March 2023**

	<b><u>Publishers</u></b>	<b><u>Participation</u></b>
	<b><u>----(Count)----</u></b>	<b><u>----(Percent)----</u></b>
	<b>(a)</b>	<b>(b)</b>
<b>Number of Distinct Publishers in Gans' Narrow Market</b>	<b>21,988</b>	<b>100.00 %</b>
Publishers who Only Sell Ads in Gans' Narrow Market	4,265	19.40
Publishers who Sell Ads Inside and Outside Gans' Narrow Market	17,723	80.60

Notes: Publishers are considered to be using an outside channel if greater than 0.5 percent of their total impressions are on that channel.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 59**  
**Outstream Video Ad Autoplaying on Sports Illustrated Video Article**

The screenshot shows the Sports Illustrated website interface. At the top is a red navigation bar with the 'SI' logo and links for various sports leagues (SUPER BOWL, NFL, NCAA, NBA, etc.). Below this is a secondary navigation bar for the NFL section. The main article title is '2024 NFL Pro Bowl Winners and Losers: The Real Flop Is Tuning In to Watch'. A sub-headline reads: 'With a 64-59 final score, the annual flag football game hosted in Orlando on Sunday has lost any pride or high regard that once accompanied it.' The author is 'MATT VERDERAME • 1 HOUR AGO'. An autoplaying video ad is displayed over the article content. The ad features a man and a woman at a table with a fondue pot, with the text 'If your fondue comes with a side of fondue'. To the right of the article is a 'Scratchers' ad and a 'Latest NFL News' section with several headlines. At the bottom of the page is a banner for 'TAHOE FOREST HEALTH SYSTEM' with the text 'Need to visit Urgent Care, but don't want to wait? Reserve your spot with online On My Way!'.

**2024 NFL Pro Bowl Winners and Losers: The Real Flop Is Tuning In to Watch**

With a 64-59 final score, the annual flag football game hosted in Orlando on Sunday has lost any pride or high regard that once accompanied it.

MATT VERDERAME • 1 HOUR AGO

**If your fondue comes with a side of fondue**

**Latest NFL News**

- QB Of Future: Could Jets Target Senior Bowl MVP?
- WATCH: Texans Pro Bowl QB C.J. Stroud Throws Dime TD to Bengals' Ja'Marr Chase
- NFL Mock Draft: Patriots Pick Heisman Trophy QB?
- Larry Fitzgerald Moment With 49ers Fan Goes Viral
- Report: Jaguars to Hire Auburn's Jeremy Garrett as DL Coach

**Need to visit Urgent Care, but don't want to wait?**  
Reserve your spot with online **On My Way!**

**TAHOE FOREST HEALTH SYSTEM**

Source: Matt Verderame, "2024 NFL Pro Bowl Winners and Losers: The Real Flop Is Tuning In to Watch," Sports Illustrated, February 4, 2024, available at: <https://www.si.com/nfl/2024/02/04/pro-bowl-winners-losers-watch-flag-football>.

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**Figure 60**  
**AdX and DFP Publishers Sell Display Ads (Narrow) and Other Ad Formats and Environments**  
**June 2018 - March 2023**

	<b>Number of Publishers</b>	<b>Publisher Revenue (USD)</b>	<b>Share of Number of Publishers</b>	<b>Share of Publisher Revenue (USD)</b>
	<b>(a)</b>	<b>(b)</b>	<b>(c)</b>	<b>(d)</b>
<b>Totals Across AdX and DFP Publishers</b>	<b>18,254</b>	<b>28,807,778,451</b>		
<b>Publishers Who Only Sell One Type of Ad</b>				
Display Ads (Narrow)	6,286	240,798,042	34.44%	0.84%
Audio Ads	0	0	0.00%	0.00%
Video Ads	187	4,301,416	1.02%	0.01%
In-App Ads	629	76,506,990	3.45%	0.27%
CTV Ads	1	0	0.01%	0.00%
Other	20	161,268	0.11%	0.00%
<b>Publishers Who Sell Multiple Forms of Ads</b>				
Excluding Display Ads (Narrow)	699	168,389	3.83%	0.00%
Including Display Ads (Narrow) and:	10,433	15,814,656,980	57.15%	54.90%
Video Ads	7,856	4,300,105,797	43.04%	14.93%
Audio Ads	78	287,546,836	0.43%	1.00%
Apps	1,691	3,732,925,168	9.26%	12.96%
CTV	436	369,079,788	2.39%	1.28%
Other	6,930	3,036,820,731	37.96%	10.54%

Notes: Publishers “Single-Homing” are identified as those using only the given ad formats and/or environments. Publishers “Multi-Homing” are those using Display (Narrow) ads and at least one other channel, or those using more than one format and/or channel but not using display ads (narrow) at all. Publishers are considered to be using a channel if greater than 0.5 percent of their total ad revenue is from that channel. Includes all AdX publishers and transaction types.

Source: MDL RFP 243 AdX Data.



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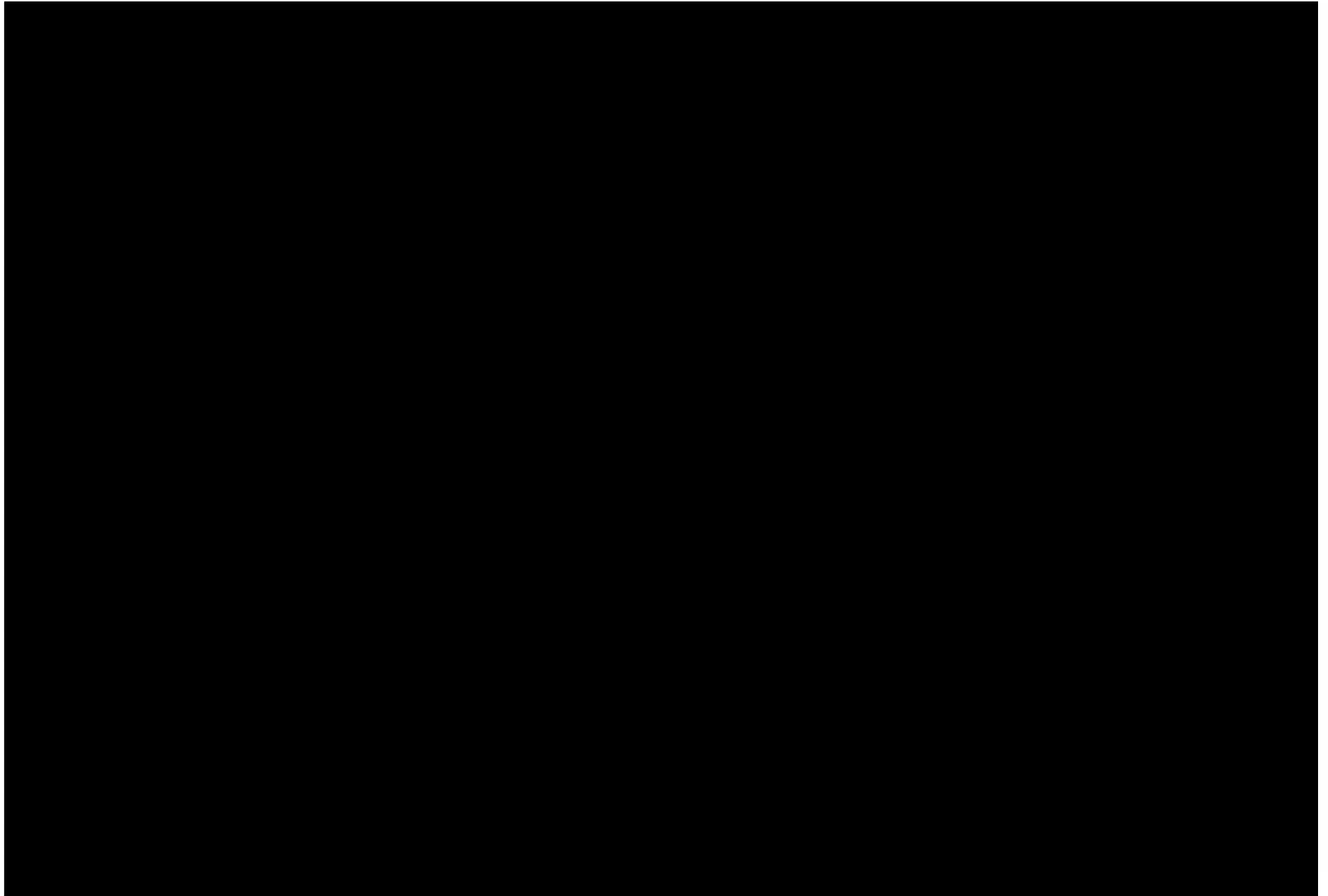
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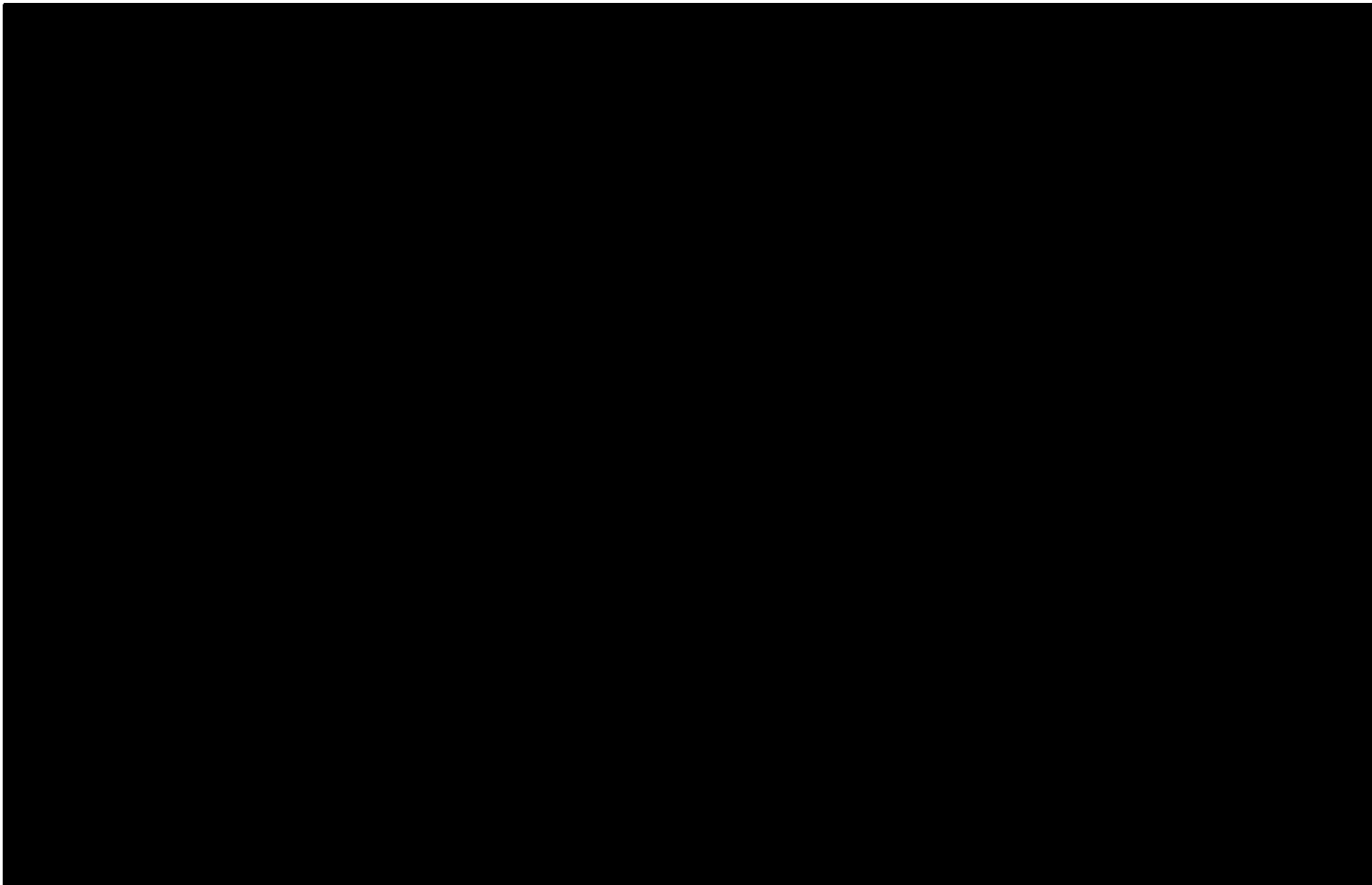
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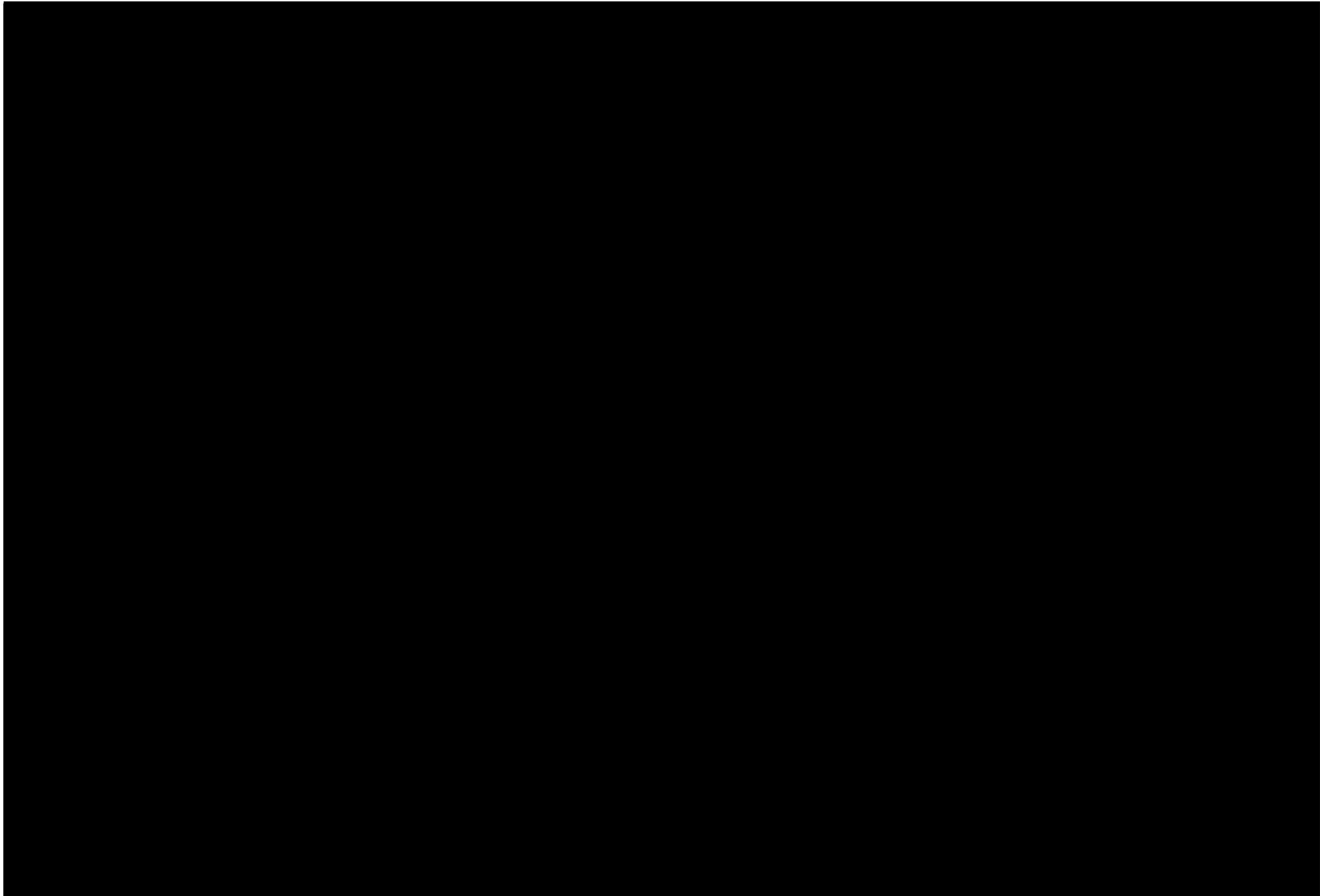
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**Figure 79**  
**Reproduced Appendix Exhibit 21 from Simonson Report**  
**HIGHER-SPEND ADVERTISER SURVEY**  
**NUMBER OF AD BUYING TOOLS USED IN PAST YEAR**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q8: An ad buying tool is a programmatic advertising platform that allows advertisers and media buying agencies to bid automatically on display ad inventory from a wide range of publishers. Some ad buying tools can also be used to buy video and search ad inventory. Ad buying tools include demand side platforms, or “DSPs.” Which of the following ad buying tools, if any, have you and/or your business unit/team used during the past year for programmatic display advertising?

Number of Ad Buying Tools Selected	Total Respondents		\$500K – \$15M Ad Spend		> Than \$15M Ad Spend	
	#	%	#	%	#	%
[A]	[B]	[C]	[D]	[E]	[F]	[G]
[1] Zero	-	-	-	-	-	-
[2] One	113	25%	75	31%	38	18%
[3] More Than One	335	74%	168	69%	167	80%
[4] Two	126	28%	66	27%	60	29%
[5] Three	88	19%	50	20%	38	18%
[6] Four or More	121	27%	52	21%	69	33%
[7] Don't know / Unsure	5	1%	1	0%	4	2%
[8] Total Shown Question	453	100%	244	100%	209	100%
[9] Average # of Ad Buying Tools Selected	2.9		2.6		3.2	

Notes & Sources:

From Higher-Spend Advertiser Survey.

Respondents with annual ad spend of less than \$500K or who selected “Don't know / Unsure” in QS10 were screened out of the survey.

[9] Calculated as the average number of ad buying tools selected by respondents. Excludes respondents who selected “Don't know / Unsure.”

Source: Simonson Report, Appendix Exhibit 21.

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**Figure 80**  
**Reproduced Appendix Exhibit 49 from Simonson Report**

**LOWER-SPEND ADVERTISER SURVEY**  
**NUMBER OF DIGITAL DISPLAY PLATFORMS USED IN PAST YEAR**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q4: Digital display ads are digital ads made up of text, image, video and/or other multimedia components that typically appear along the top or sides of a website, or sometimes in the middle of other content on a website. Examples of display ad formats include banner ads, animations, and interactive content. Display ads do not include ads placed on social media platforms. Which of the following platforms, if any, have you used during the last 12 months for digital display advertising?

Number of Platforms Selected	Total Respondents		< Than \$50K Ad Spend		\$50K – \$500K Ad Spend	
	#	%	#	%	#	%
[A]	[B]	[C]	[D]	[E]	[F]	[G]
[1] Zero	-	0%	-	0%	-	0%
[2] One	52	21%	25	21%	27	21%
[3] More Than One	188	77%	91	78%	97	77%
[4] Two	97	40%	60	51%	37	29%
[5] Three	50	21%	21	18%	29	23%
[6] Four or More	41	17%	10	9%	31	25%
[7] Don't know/Unsure	3	1%	1	1%	2	2%
[8] Total Shown Question	243	100%	117	100%	126	100%
[9] Average # of Display Platforms Selected	2.4		2.2		2.7	

Notes & Sources:

From Lower-Spend Advertiser Survey.

[9] Calculated as the average number of display platforms selected by respondents. Excludes respondents who selected "Don't know/Unsure."

Source: Simonson Report, Appendix Exhibit 49.

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**Figure 81**  
**Reproduced Exhibit 20 from Simonson Report**

**HIGHER-SPEND ADVERTISER SURVEY**  
**AD BUYING TOOLS USED IN PAST YEAR**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q8: An ad buying tool is a programmatic advertising platform that allows advertisers and media buying agencies to bid automatically on display ad inventory from a wide range of publishers. Some ad buying tools can also be used to buy video and search ad inventory. Ad buying tools include demand side platforms, or "DSPs." Which of the following ad buying tools, if any, have you and/or your business unit/team used during the past year for programmatic display advertising?

Ad Buying Tool	Total Respondents		\$500K – \$15M Ad Spend		> Than \$15M Ad Spend	
	#	%	#	%	#	%
[A]	[B]	[C]	[D]	[E]	[F]	[G]
[1] Google Ads	305	67%	164	67%	141	67%
[2] Google DV360	193	43%	106	43%	87	42%
[3] Amazon DSP	159	35%	83	34%	76	36%
[4] Adobe Advertising Cloud	98	22%	47	19%	51	24%
[5] The Trade Desk DSP	90	20%	36	15%	54	26%
[6] Yahoo DSP (formerly Verizon Media DSP)	63	14%	26	11%	37	18%
[7] Criteo	54	12%	20	8%	34	16%
[8] Taboola	36	8%	19	8%	17	8%
[9] StackAdapt	32	7%	20	8%	12	6%
[10] Adform	29	6%	11	5%	18	9%
[11] Outbrain	28	6%	10	4%	18	9%
[12] MediaMath DSP	26	6%	10	4%	16	8%
[13] Xandr Invest	26	6%	12	5%	14	7%
[14] Zeta Global	23	5%	5	2%	18	9%
[15] Quantcast	22	5%	11	5%	11	5%
[16] Amobee	21	5%	6	2%	15	7%
[17] Simpli.fi	20	4%	7	3%	13	6%
[18] Illumin (formerly AcuityAds)	15	3%	7	3%	8	4%
[19] Basis by Centro	14	3%	7	3%	7	3%
[20] Adelphic	13	3%	7	3%	6	3%
[21] Beeswax	8	2%	5	2%	3	1%
[22] Ad Step Technologies	-	-	-	-	-	-
[23] Quorexx	-	-	-	-	-	-
[24] Other	10	2%	7	3%	3	1%
[25] Don't know / Unsure	5	1%	1	0%	4	2%
[26] Total Shown Question	453	100%	244	100%	209	100%

Notes & Sources

From Higher-Spend Advertiser Survey.

Sorted in descending order based on column [B], except for "Other" and "Don't know / Unsure."

Respondents with annual ad spend of less than \$500K or who selected "Don't know / Unsure" in Q510 were screened out of the survey.

Percentages do not add up to 100% because respondents can select multiple options.

Source: Simonson Report, Appendix Exhibit 20.



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**Figure 82**  
**Reproduced Appendix Exhibit 48 from Simonson Report**  
**LOWER-SPEND ADVERTISER SURVEY**  
**DIGITAL DISPLAY PLATFORMS USED IN PAST YEAR**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q4: Digital display ads are digital ads made up of text, image, video and/or other multimedia components that typically appear along the top or sides of a website, or sometimes in the middle of other content on a website. Examples of display ad formats include banner ads, animations, and interactive content. Display ads do not include ads placed on social media platforms. Which of the following platforms, if any, have you used during the last 12 months for digital display advertising?

Platform	Total Respondents		< Than \$50K Ad Spend		\$50K – \$500K Ad Spend	
	#	%	#	%	#	%
[A]	[B]	[C]	[D]	[E]	[F]	[G]
[1] Google Ads	155	64%	74	63%	81	64%
[2] Amazon DSP	119	49%	60	51%	59	47%
[3] Google DV360	82	34%	33	28%	49	39%
[4] Adobe Advertising Cloud	62	26%	20	17%	42	33%
[5] Yahoo DSP (formerly Verizon Media DSP)	38	16%	16	14%	22	17%
[6] MediaMath DSP	34	14%	14	12%	20	16%
[7] The Trade Desk DSP	30	12%	12	10%	18	14%
[8] Quantcast	21	9%	5	4%	16	13%
[9] Criteo	18	7%	8	7%	10	8%
[10] Amobee	18	7%	7	6%	11	9%
[11] Ad Step Technologies	-	-	-	-	-	-
[12] Other	4	2%	3	3%	1	1%
[13] Don't know / Unsure	3	1%	1	1%	2	2%
[14] Total Shown Question	243	100%	117	100%	126	100%

Notes & Sources:

From Lower-Spend Advertiser Survey.

Sorted in descending order based on column [B], except for "Other" and "Don't know/Unsure."

Percentages do not add up to 100% because respondents can select multiple options.

Source: Simonson Report, Appendix Exhibit 20.

HIGHLY CONFIDENTIAL - SUBJECT TO PROTECTIVE ORDER

**Figure 83**  
**Reproduced Appendix Exhibit 23 from Simonson Report**  
**Part One of Two**

**HIGHER-SPEND ADVERTISER SURVEY**  
**GOOGLE USERS**  
**NUMBER OF OTHER AD BUYING TOOLS**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q8: An ad buying tool is a programmatic advertising platform that allows advertisers and media buying agencies to bid automatically on display ad inventory from a wide range of publishers. Some ad buying tools can also be used to buy video and search ad inventory. Ad buying tools include demand side platforms, or "DSPs." Which of the following ad buying tools, if any, have you and/or your business unit/team used during the past year for programmatic display advertising?

	# of Other Ad Buying Tools (Incl. Google Tools)	Google Ads Users			Google DV360 Users		
		Total Respondents	\$500K – \$15M Ad Spend	> Than \$15M Ad Spend	Total Respondents	\$500K – \$15M Ad Spend	> Than \$15M Ad Spend
		[B]	[C]	[D]	[E]	[F]	[G]
[1]	0	41	25	16	15	10	5
[2]	1	97	55	42	44	27	17
[3]	2	67	38	29	43	28	15
[4]	3	42	17	25	36	15	21
[5]	4+	58	29	29	55	26	29
[6]	Total Respondents	305	164	141	193	106	87
[7]	Average # of Other Ad Buying Tools	2.2	2.0	2.4	2.8	2.4	3.3

	# of Other Ad Buying Tools (Incl. Google Tools)	Google Ads Users			Google DV360 Users		
		Total Respondents	\$500K – \$15M Ad Spend	> Than \$15M Ad Spend	Total Respondents	\$500K – \$15M Ad Spend	> Than \$15M Ad Spend
		[B]	[C]	[D]	[E]	[F]	[G]
[8]	0	13%	15%	11%	8%	9%	6%
[9]	1	32%	34%	30%	23%	25%	20%
[10]	2	22%	23%	21%	22%	26%	17%
[11]	3	14%	10%	18%	19%	14%	24%
[12]	4+	19%	18%	21%	28%	25%	33%
[13]	Total Respondents	100%	100%	100%	100%	100%	100%

HIGHLY CONFIDENTIAL - SUBJECT TO PROTECTIVE ORDER

**Figure 83**  
**Reproduced Appendix Exhibit 23 from Simonson Report**  
**Part Two of Two**

**HIGHER-SPEND ADVERTISER SURVEY**  
**GOOGLE USERS**  
**NUMBER OF OTHER AD BUYING TOOLS**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q8: An ad buying tool is a programmatic advertising platform that allows advertisers and media buying agencies to bid automatically on display ad inventory from a wide range of publishers. Some ad buying tools can also be used to buy video and search ad inventory. Ad buying tools include demand side platforms, or "DSPs." Which of the following ad buying tools, if any, have you and/or your business unit/team used during the past year for programmatic display advertising?

	# of Non-Google Ad Buying Tools	Google Ads Users			Google DV360 Users		
		Total Respondents	\$500K – \$15M Ad Spend	> Than \$15M Ad Spend	Total Respondents	\$500K – \$15M Ad Spend	> Than \$15M Ad Spend
	[A]	[B]	[C]	[D]	[E]	[F]	[G]
[14]	0	75	47	28	49	32	17
[15]	1	98	55	43	45	27	18
[16]	2	65	31	34	41	21	20
[17]	3	35	19	16	29	17	12
[18]	4+	32	12	20	29	9	20
[19]	Total Respondents	305	164	141	193	106	87
[20]	Average # of Non-Google Ad Buying Tools	1.7	1.5	1.0	1.0	1.6	1.5

	# of Non-Google Ad Buying Tools	Google Ads Users			Google DV360 Users		
		Total Respondents	\$500K – \$15M Ad Spend	> Than \$15M Ad Spend	Total Respondents	\$500K – \$15M Ad Spend	> Than \$15M Ad Spend
	[A]	[B]	[C]	[D]	[E]	[F]	[G]
[21]	0	25%	29%	20%	25%	30%	20%
[22]	1	32%	34%	30%	23%	25%	21%
[23]	2	21%	19%	24%	21%	20%	23%
[24]	3	11%	12%	11%	15%	16%	14%
[25]	4+	10%	7%	14%	15%	9%	23%
[26]	Total Respondents	100%	100%	100%	100%	100%	100%

Notes & Sources:

From Higher-Spend Advertiser Survey.

Respondents with annual ad spend of less than \$500K or who selected "Don't know / Unsure" in Q510 were screened out of the survey.

Percentages calculated by dividing the number of people choosing "Google Ads" or "Google DV360" for a given number of selected ad buying tools by the total number of people choosing "Google Ads" or "Google DV360."

Source: Simonson Report, Appendix Exhibit 23.



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**Figure 84**  
**Reproduced Appendix Exhibit 51 from Simonson Report**  
**Part One of Two**

**LOWER-SPEND ADVERTISER SURVEY**  
**GOOGLE USERS**  
**NUMBER OF OTHER DISPLAY PLATFORMS**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q4: Digital display ads are digital ads made up of text, image, video and/or other multimedia components that typically appear along the top or sides of a website, or sometimes in the middle of other content on a website. Examples of display ad formats include banner ads, animations, and interactive content. Display ads do not include ads placed on social media platforms. Which of the following platforms, if any, have you used during the last 12 months for digital display advertising?

	# of Other Display Platforms (Inc. Google Tools)	Google Ads Users			Google DV360 Users		
		Total Respondents	< Than \$50K Ad Spend	\$50K – \$500K Ad Spend	Total Respondents	< Than \$50K Ad Spend	\$50K – \$500K Ad Spend
	[A]	[B]	[C]	[D]	[E]	[F]	[G]
[1]	0	23	12	11	3	3	-
[2]	1	66	40	26	25	11	14
[3]	2	31	13	18	25	11	14
[4]	3	21	6	15	17	5	12
[5]	4+	14	3	11	12	3	9
[6]	Total Respondents	155	74	81	82	33	49
[7]	Average # of Other Platforms	1.6	1.3	1.9	2.2	1.8	2.4

	# of Other Display Platforms (Inc. Google Tools)	Google Ads Users			Google DV360 Users		
		Total Respondents	< Than \$50K Ad Spend	\$50K – \$500K Ad Spend	Total Respondents	< Than \$50K Ad Spend	\$50K – \$500K Ad Spend
	[A]	[B]	[C]	[D]	[E]	[F]	[G]
[8]	0	15%	16%	14%	4%	9%	0%
[9]	1	43%	54%	32%	30%	33%	29%
[10]	2	20%	18%	22%	30%	33%	29%
[11]	3	14%	8%	19%	21%	15%	24%
[12]	4+	9%	4%	14%	15%	9%	18%
[13]	Total Respondents	100%	100%	100%	100%	100%	100%

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**Figure 84**  
**Reproduced Appendix Exhibit 51 from Simonson Report**  
**Part Two of Two**

**LOWER-SPEND ADVERTISER SURVEY**  
**GOOGLE USERS**  
**NUMBER OF OTHER DISPLAY PLATFORMS**  
**EXCLUDING RESPONDENTS WHO SELECTED A DECOY OPTION**

Q4: Digital display ads are digital ads made up of text, image, video and/or other multimedia components that typically appear along the top or sides of a website, or sometimes in the middle of other content on a website. Examples of display ad formats include banner ads, animations, and interactive content. Display ads do not include ads placed on social media platforms. Which of the following platforms, if any, have you used during the last 12 months for digital display advertising?

	# of Non-Google Platforms	Google Ads Users			Google DV360 Users		
		Total Respondents	< Than \$50K Ad Spend	\$50K – \$500K Ad Spend	Total Respondents	< Than \$50K Ad Spend	\$50K – \$500K Ad Spend
	[A]	[B]	[C]	[D]	[E]	[F]	[G]
[14]	0	37	16	21	17	7	10
[15]	1	70	44	26	29	15	14
[16]	2	28	10	18	22	8	14
[17]	3	12	3	9	8	2	6
[18]	4+	8	1	7	6	1	5
[19]	Total Respondents	155	74	81	82	33	49
[20]	Average # of Non-Google Platforms	1.3	1.0	1.4	1.5	1.2	1.7

	# of Non-Google Platforms	Google Ads Users			Google DV360 Users		
		Total Respondents	< Than \$50K Ad Spend	\$50K – \$500K Ad Spend	Total Respondents	< Than \$50K Ad Spend	\$50K – \$500K Ad Spend
	[A]	[B]	[C]	[D]	[E]	[F]	[G]
[21]	0	24%	22%	26%	21%	21%	20%
[22]	1	45%	59%	32%	35%	45%	29%
[23]	2	18%	14%	22%	27%	24%	29%
[24]	3	8%	4%	11%	10%	6%	12%
[25]	4+	5%	1%	9%	7%	3%	10%
[26]	Total Respondents	100%	100%	100%	100%	100%	100%

Notes & Sources:

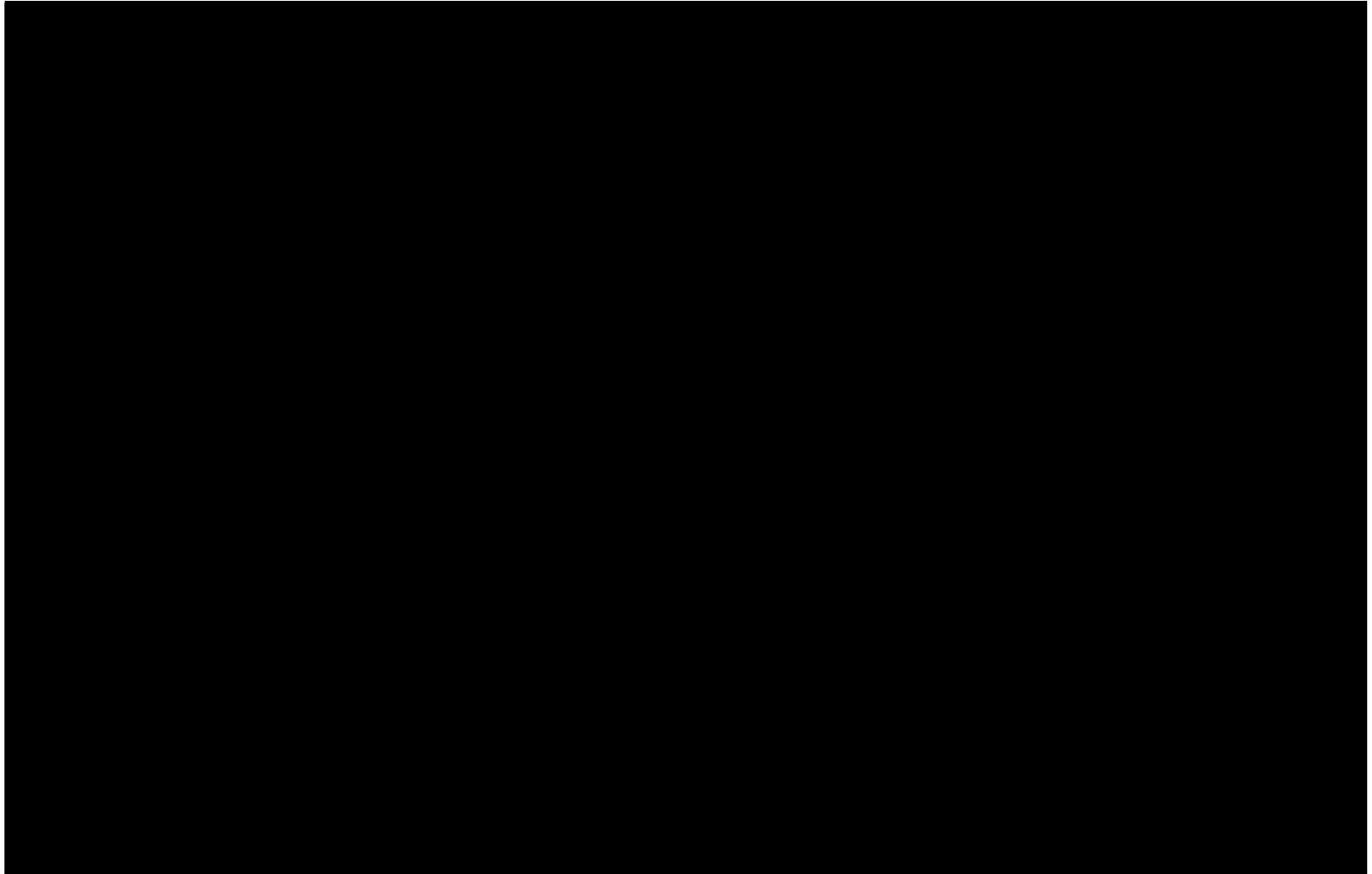
From Lower-Spend Advertiser Survey.

Percentages calculated by dividing the number of people choosing “Google Ads” or “Google DV360” for a given number of selected platforms by the total number of people choosing “Google Ads” or “Google DV360.”

Source: Simonson Report, Appendix Exhibit 51.

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**Figure 85**

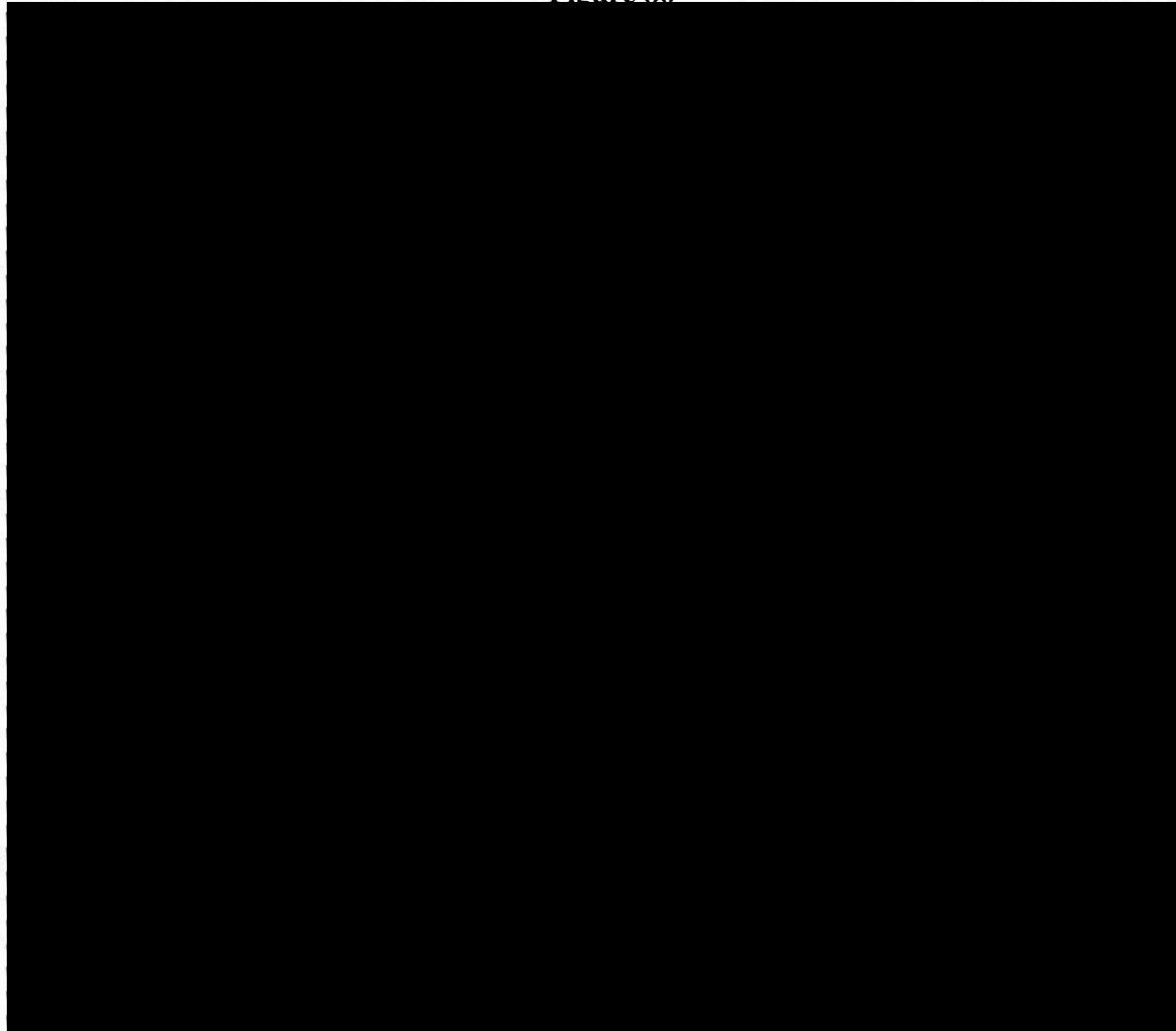


Notes: Values represent ad spending from U.S. advertisers on DV360 and Google Ads as a share of all U.S. display ad spend in eMarketer's estimates.

Source: DOJ RFP 57 eMarketer Data - "U.S. Ad Spending 2023"; MDL DV360 XBridge Data; MDL RFP 243 Google Ads Data.

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**Figure 86**

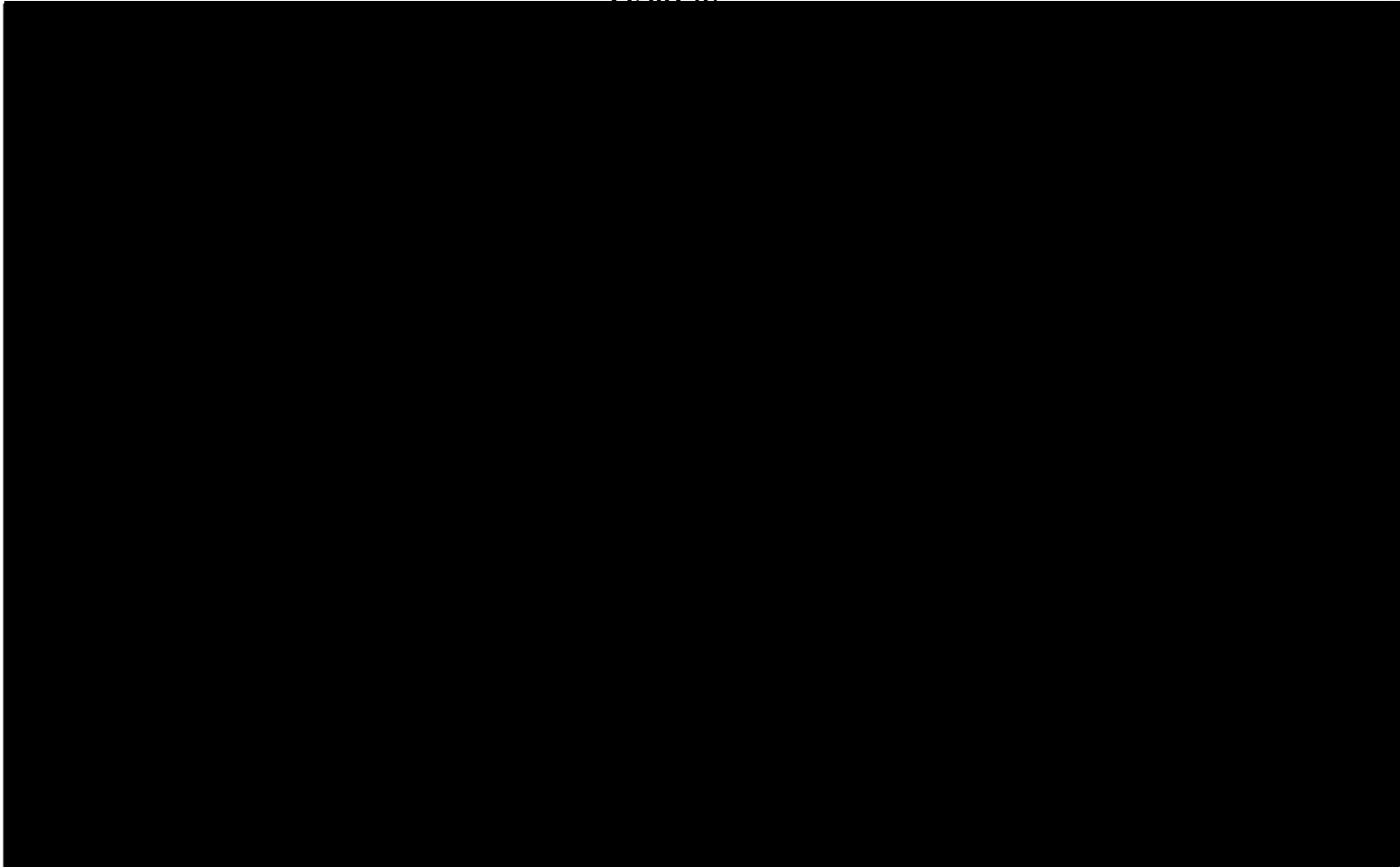


Notes: Values represent ad spending from U.S. advertisers on DV360 and Google Ads as a share of all U.S. display ad spend in eMarketer's estimates.

Source: DOJ RFP 57 eMarketer Data - "U.S. Ad Spending 2023"; MDL DV360 XBridge Data; MDL RFP 243 Google Ads Data.

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**Figure 87**

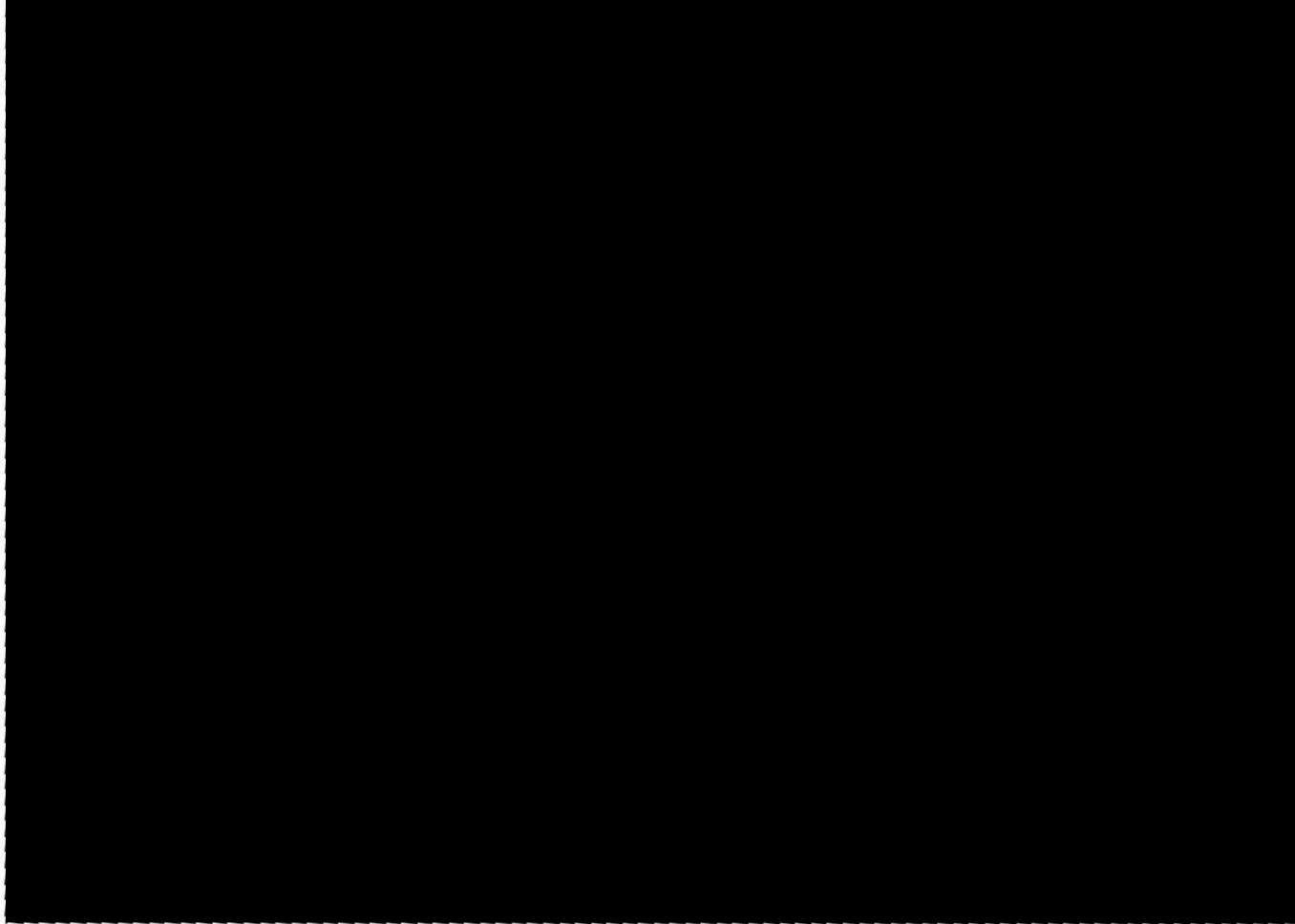


Notes: Share represents the sum of ad spend from advertisers purchasing display ads inventory on AdX, ad spend from advertisers buying through Google Ads and DV360 on AdMob and AdSense, and eMarketer's estimate of ad spend on YouTube (a Google's property) inventory, relative to all U.S. display ad spend in eMarketer estimates. AdX ad spend is multiplied by a value of [REDACTED] to approximate average buying tool fees collected before revenue enters AdX. This value has been utilized by Google for similar corrections of AdX data. (United States, et al. v. Google LLC, No 1:23-cv-00108-LMB-JFA (EDVA November, 20, 2023), Letter from D. Pearl to M. Freeman.) Open Bidding transactions are not included in the AdX total.

Source: DOJ RFP 57 eMarketer Data - "U.S. Ad Spending 2023"; MDL RFP 243 AdX Data, MDL RFP 243 Google Ads, and MDL DV360 XBridge.

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**Figure 88**

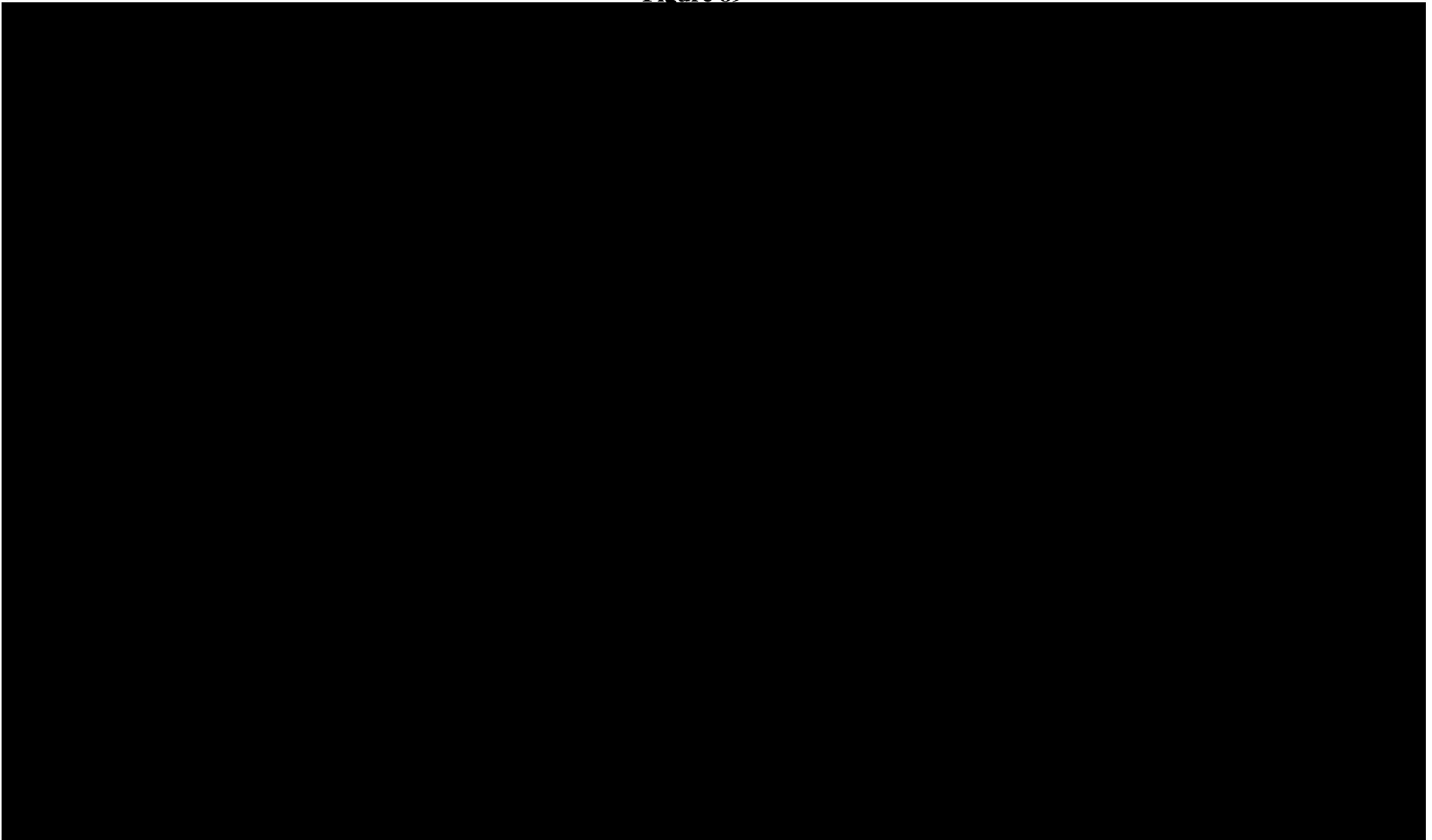


Notes: Share represents the sum of ad spend from advertisers purchasing display ads inventory on AdX, ad spend from advertisers buying through Google Ads and DV360 on AdMob and AdSense, and eMarketer's estimate of ad spend on YouTube (a Google's property) inventory, relative to all U.S. display ad spend in eMarketer estimates. AdX ad spend is multiplied by a value of [REDACTED] to approximate average buying tool fees collected before revenue enters AdX. This value has been utilized by Google for similar corrections of AdX data. (GOOG-AT-MDL-C-000012881). Open Bidding transactions are not included in the AdX total.

Source: DOJ RFP 57 eMarketer Data - "U.S. Ad Spending 2023"; MDL RFP 243 AdX Data, MDL RFP 243 Google Ads, and MDL DV360 XBridge.

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**Figure 89**

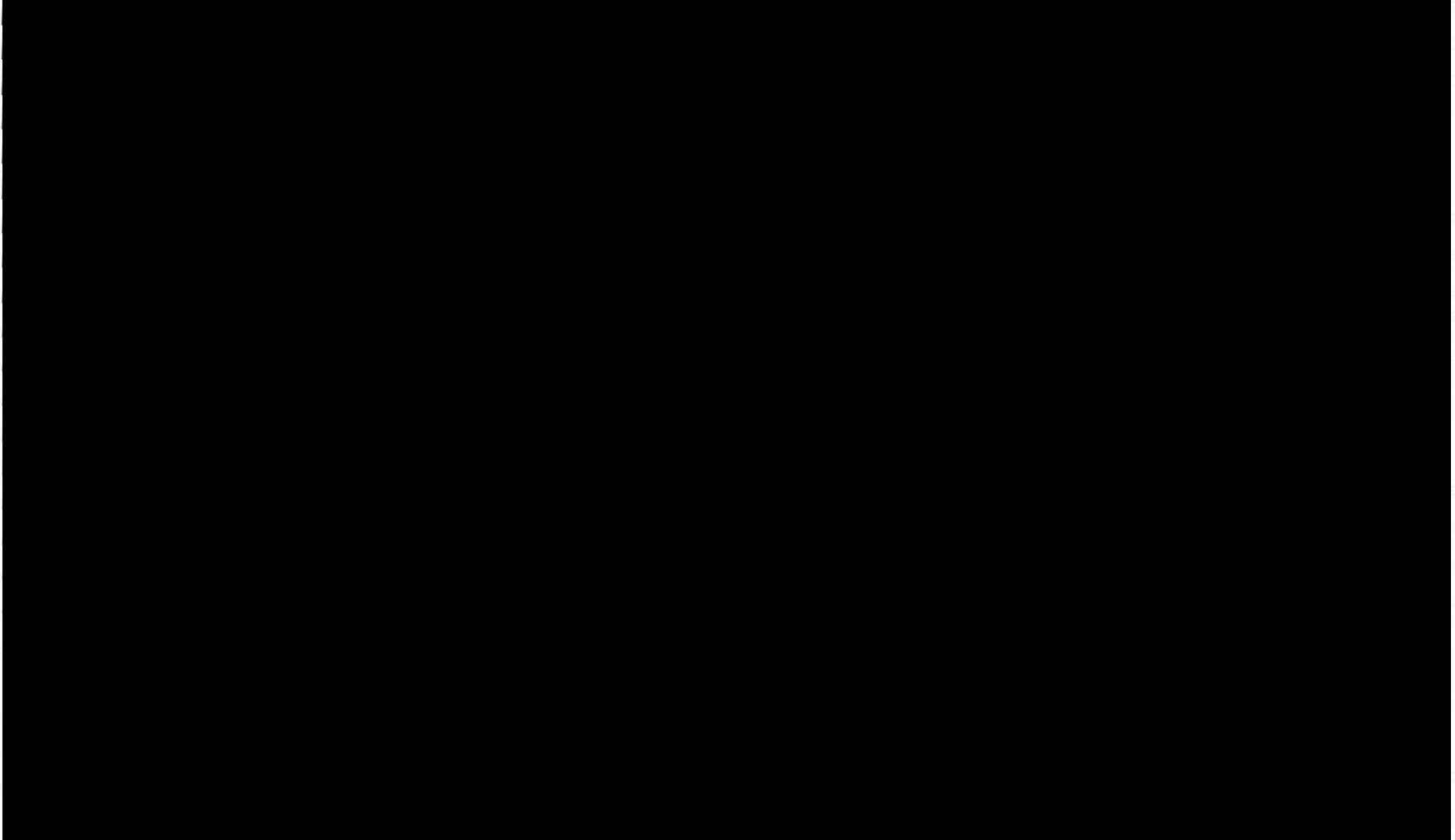


Notes: Share represents the sum of ad spend for display ads from advertisers purchasing inventory on AdX and ad spend for AdMob and AdSense from advertisers buying through Google Ads and DV360 relative to all U.S. display ad spend in eMarketer estimates. AdX ad spend is multiplied by a value of [REDACTED] to approximate average buying tool fees collected before revenue enters AdX. This value has been utilized by Google for similar corrections of AdX data. (GOOG-AT-MDL-C-000012881). Open Bidding transactions are not included in the AdX total.

Source: DOJ RFP 57 eMarketer Data - "U.S. Ad Spending 2023"; MDL RFP 243 AdX Data.

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**Figure 90**



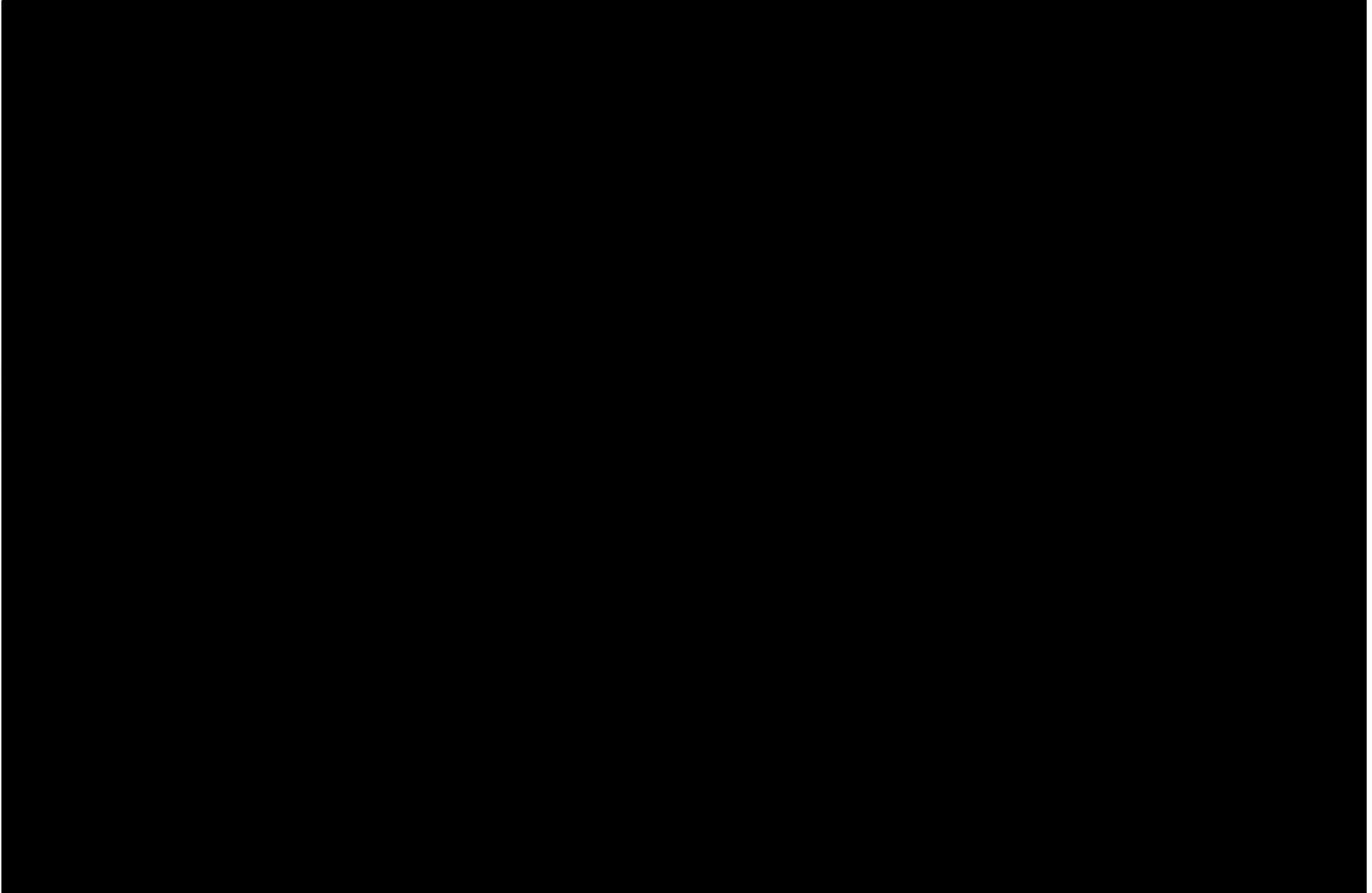
Notes: Share represents the sum of ad spend for display ads from advertisers purchasing inventory on AdX and ad spend for AdMob and AdSense from advertisers buying through Google Ads and DV360 relative to all U.S. display ad spend in eMarketer estimates. AdX ad spend is multiplied by a value of [REDACTED] to approximate average buying tool fees collected before revenue enters AdX. This value has been utilized by Google for similar corrections of AdX data. (GOOG-AT-MDL-C-000012881). Open Bidding transactions are not included in the AdX total.

Source: DOJ RFP 57 eMarketer Data - "U.S. Ad Spending 2023"; MDL RFP 243 AdX Data.



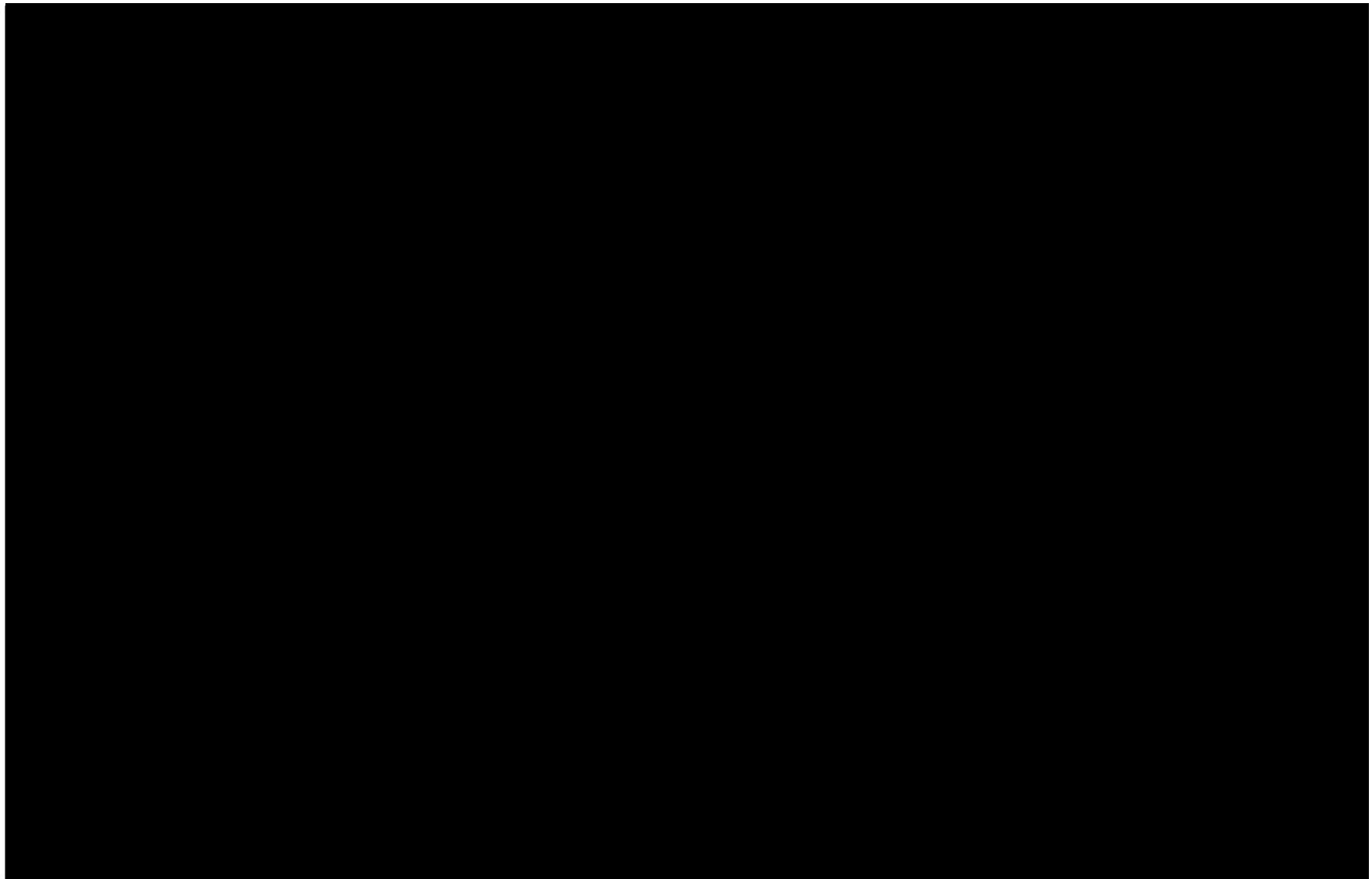
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**Figure 91**



Source: DOJ RFP 57 eMarketer Data - "U.S. Ad Spending 2023;" GOOG-DOJ-04004392.

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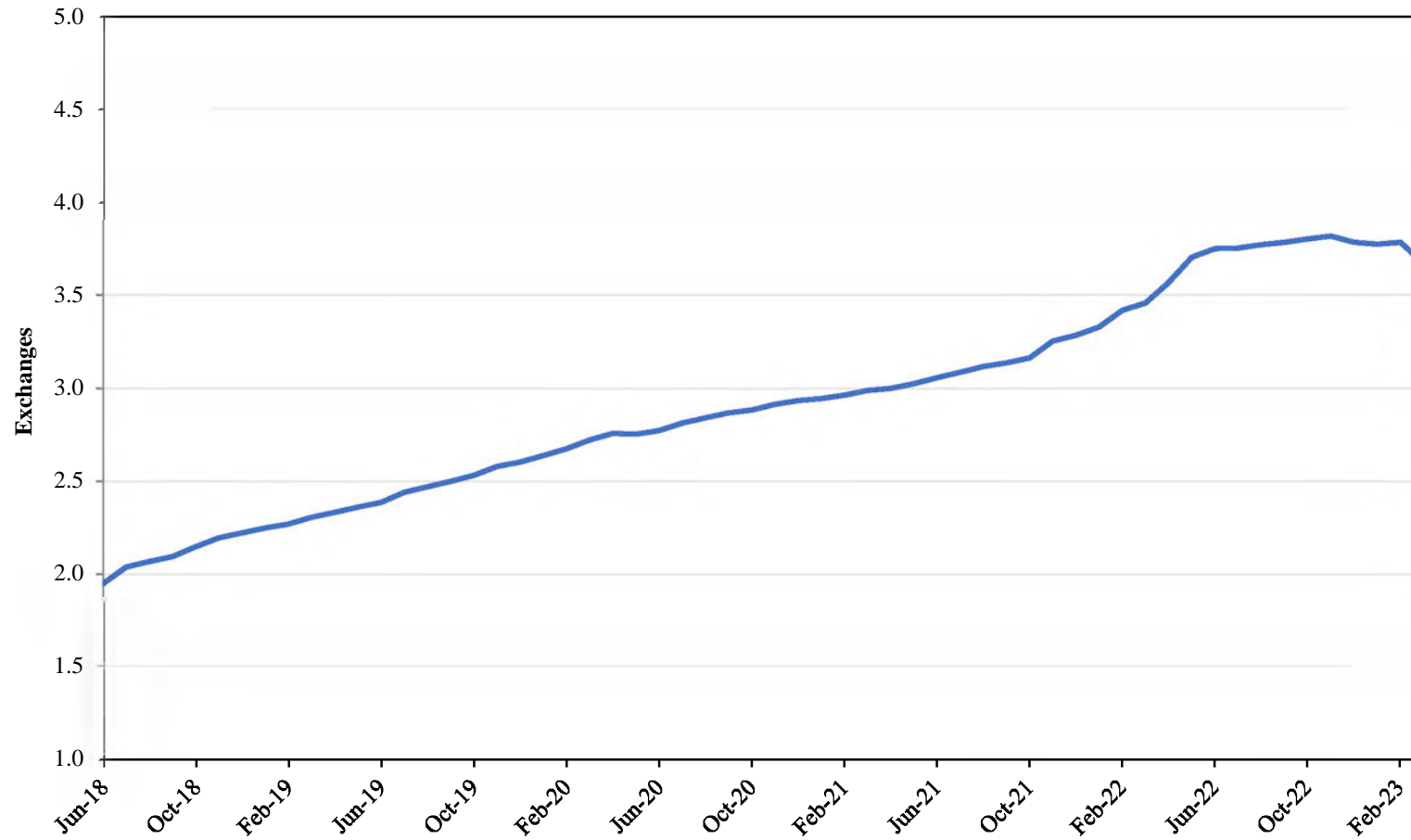


Notes: Limited to observations where adx\_ad\_source\_type\_name is "RTB: Real Time Bidders"

Source: MDL RFP 243 AdX Data.

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**Figure 93**  
**Average Number of Exchanges Through Which Each AdX and DFP Publisher**  
**Transacts Display Ads (Narrow)**  
**June 2018 - March 2023**



Notes: Limited to exchanges that transact impressions viewed by users in the United States. Unknown exchanges are grouped together as a single exchange.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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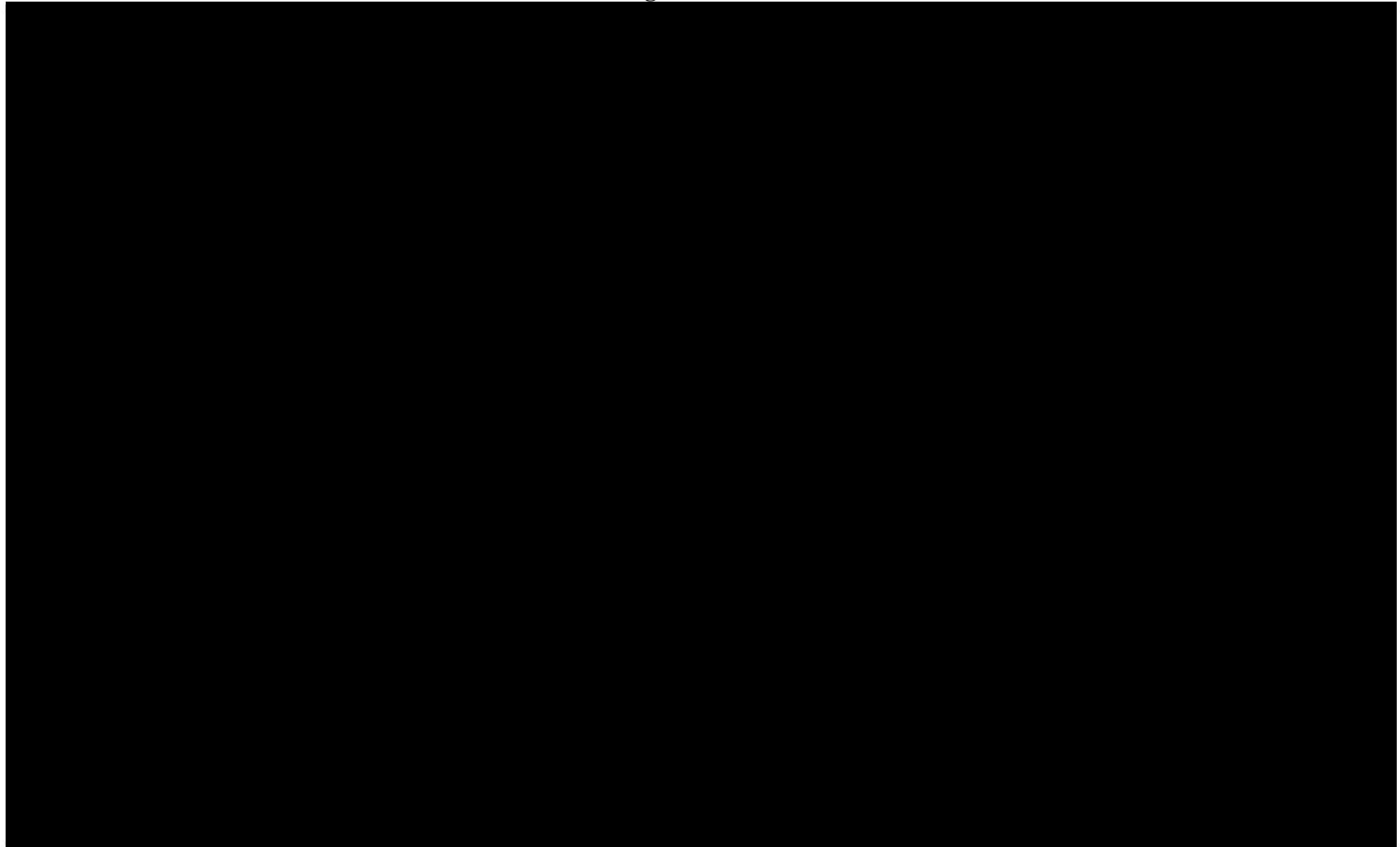


Notes: Google Ads is a free tool to use for the advertiser. Google Ads revenue share includes all fees collected from publishers when matched with Google Ads. To avoid double counting of fees collected by AdX, Google Ads is excluded from the calculation of AdX revenue share. Before July 8, 2014, Google did not record gross revenue data. *See* GOOG-AT-MDL-008932468, at -471.

Source: MDL DV360 XBridge Data; MDL RFP 243 AdX Data; MDL RFP 243 Google Ads Data.

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**Figure 95**

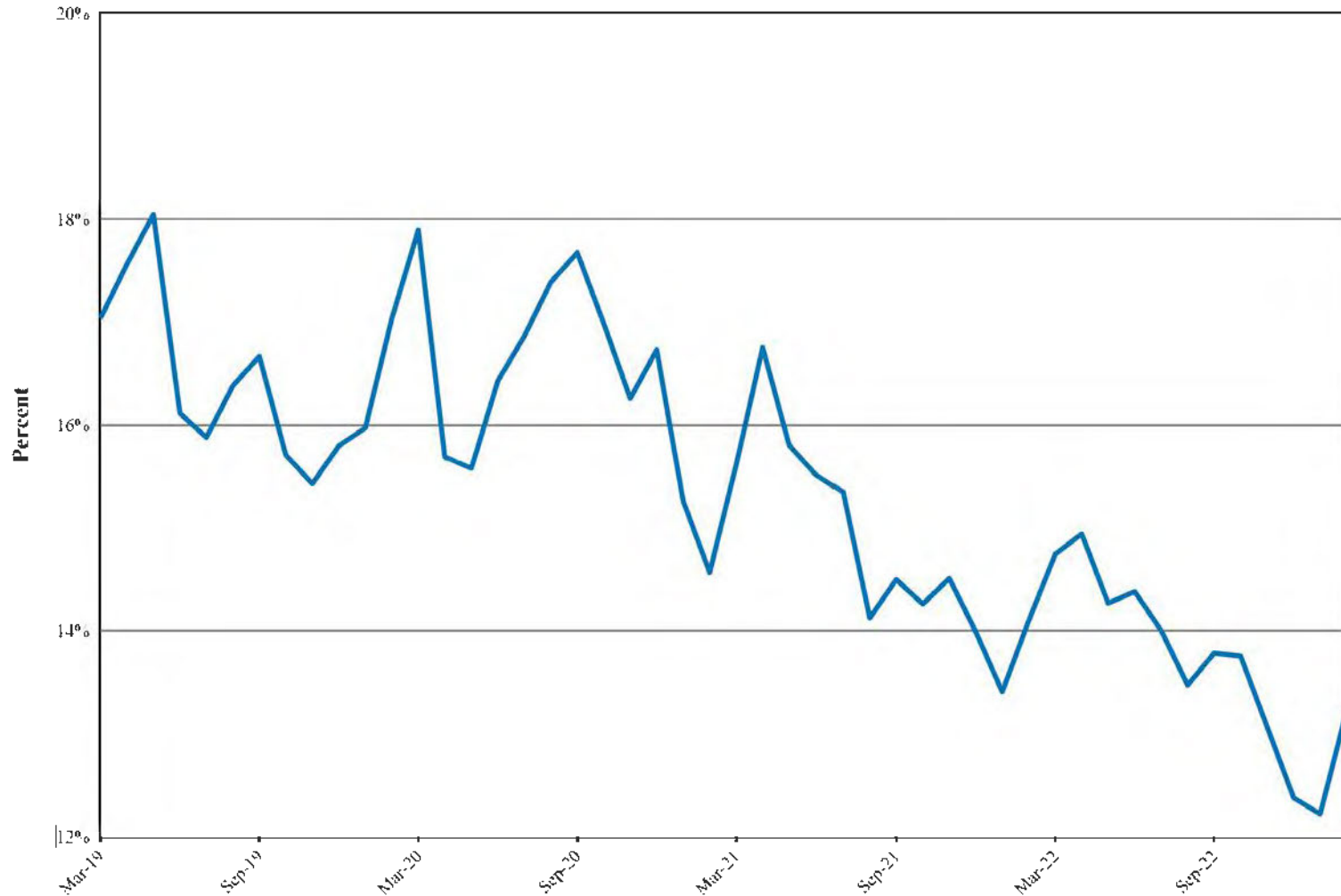


Notes: Google Ad Tech spending represents Google “display engineering” expenditures from P&L estimates. Competing ad tech firms pictured above are Magnite (formerly Rubicon Project), The Trade Desk, PubMatic, and Criteo. PubMatic 10-K reports are not available until 2018; its R&D spend is estimated in 2017 to equal what is reported in 2018.

Source: Magnite 10-K Reports; The Trade Desk 10-K Reports; PubMatic 10-K Reports; Criteo 10-K Reports; GOOG-DOJ-AT-02647839; GOOG-DOJ-AT-02647850; GOOG-DOJ-AT-02649868.

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**Figure 96**  
**Median Spam Rate of Google Publishing Partners**  
**March 2019 - February 2023**



Notes: Spam Rate measure is calculated using the median average spam clicks over last 30 days. Observation where pub\_service\_region equals "APAC", "EMEA", and "LATAM" have been excluded.

Source: DOJ RFP 57 MCM - SPM Data - Channel Partner Health Score.

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**Figure 97**  
**Number of U.S. Publishers Across AdX**  
**June 2013 - March 2023**



Notes: Publisher count is limited to publishers selling narrow display ads.

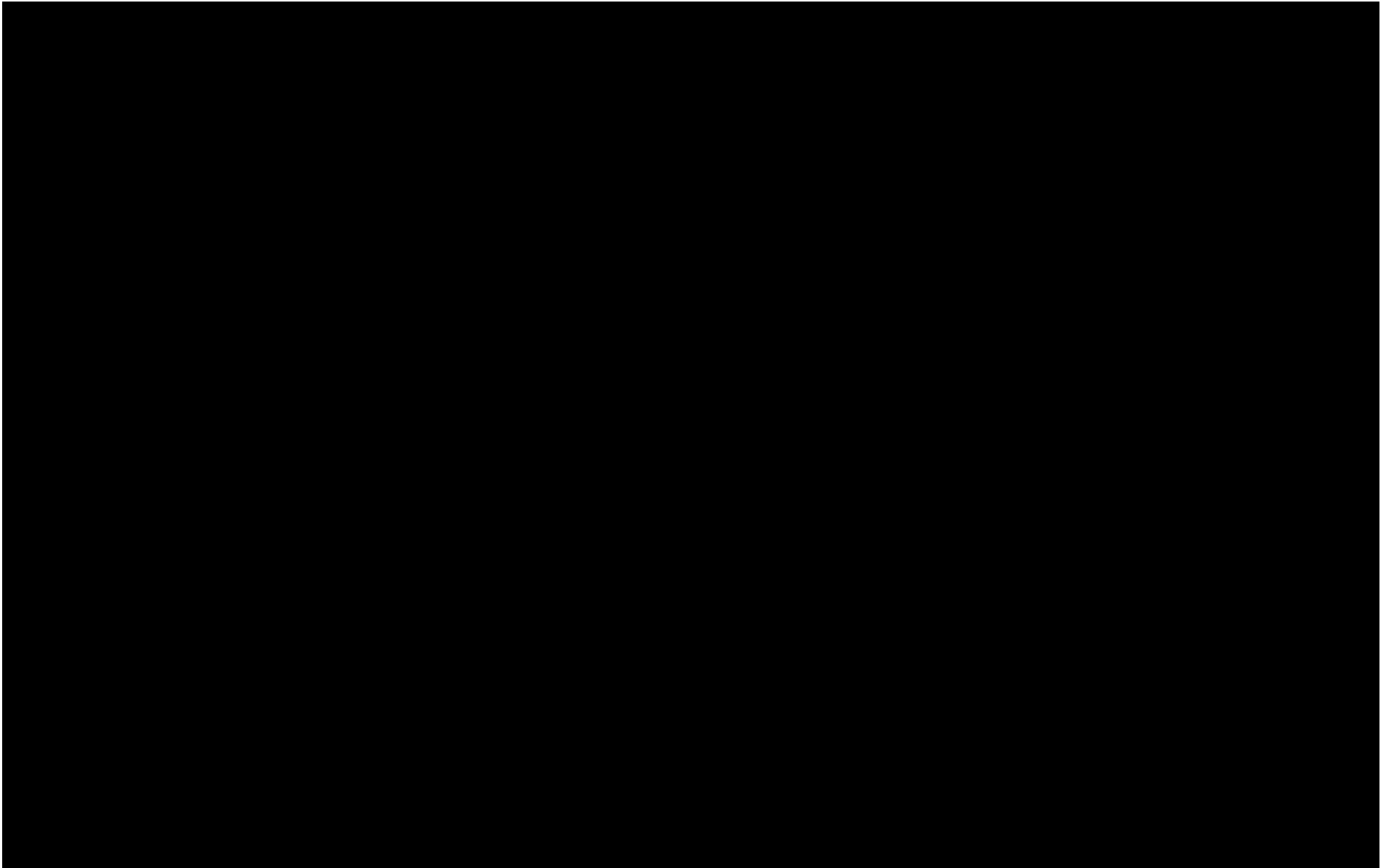
Source: MDL RFP 243 AdX Data.

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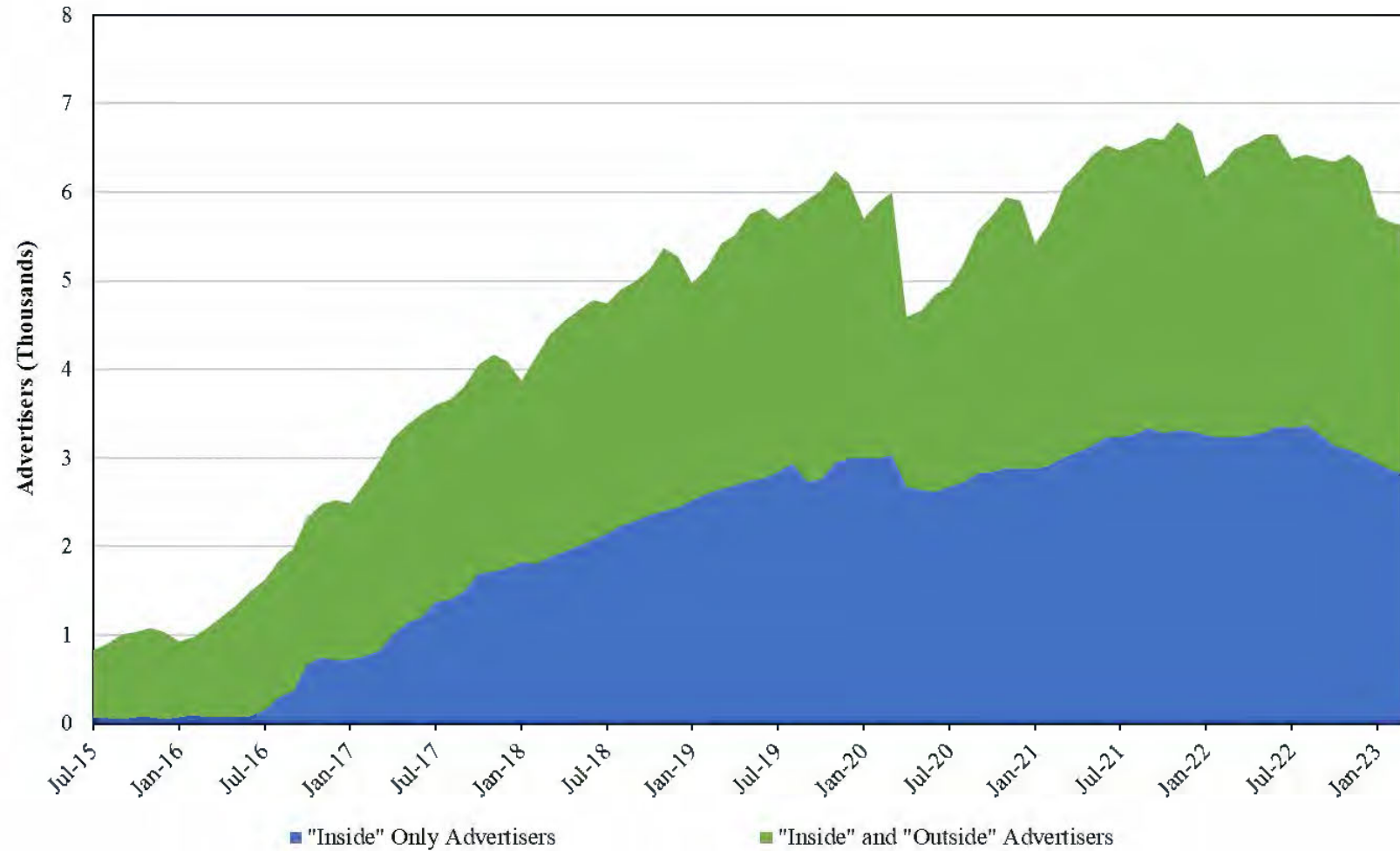


HIGHLY CONFIDENTIAL - SUBJECT TO PROTECTIVE ORDER



HIGHLY CONFIDENTIAL - SUBJECT TO PROTECTIVE ORDER

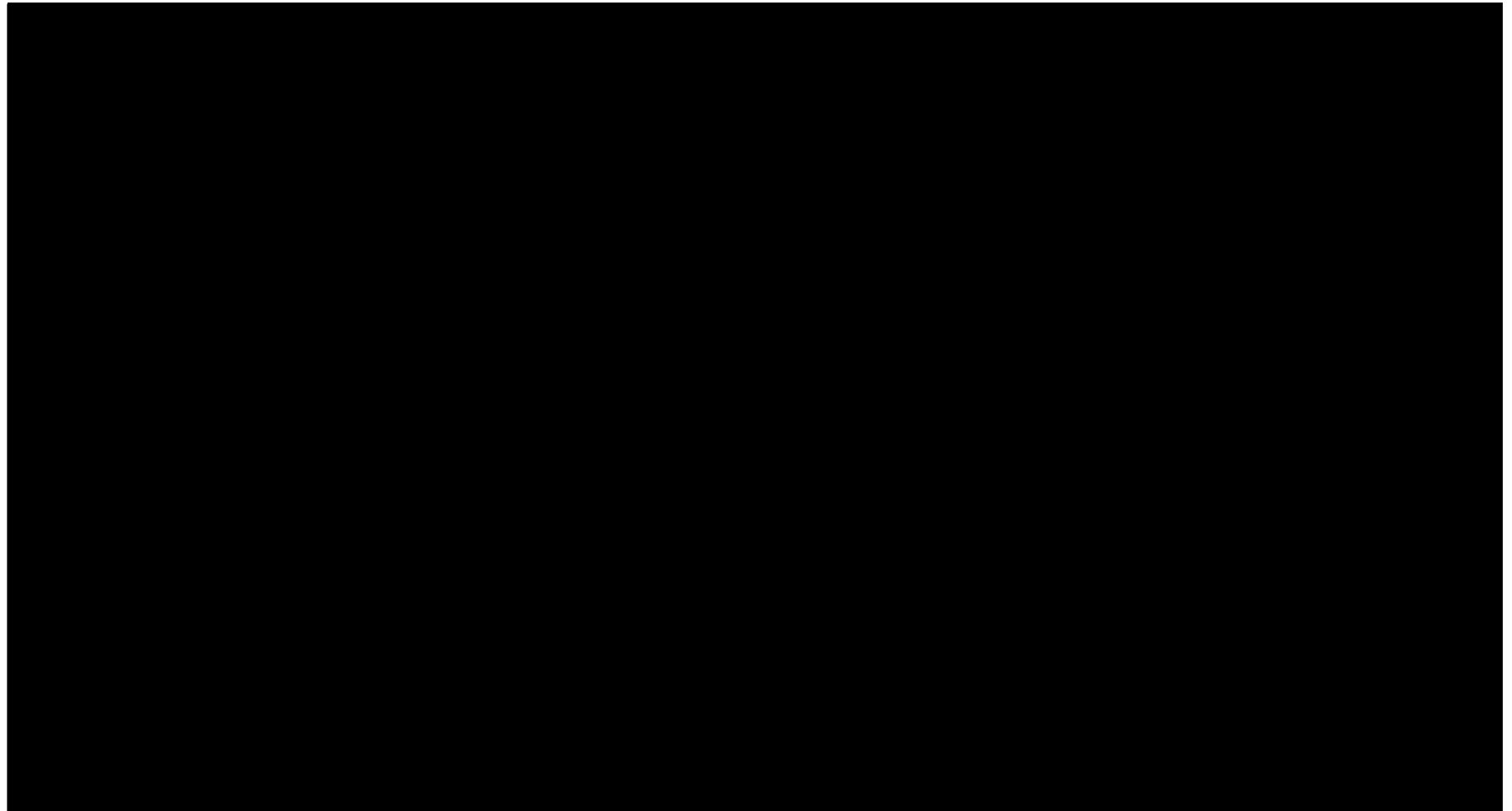
**Figure 100**  
**Count of U.S. Advertisers Using a Large Advertiser Buying Tool (DV360) To Buy Display Ads (Narrow) By Whether**  
**Advertisers Buy Ads on Outside Channels**  
**July 2015 - March 2023**



Notes: Advertisers are considered to be using a channel if greater than 0.5 percent of their total ad spend is on that channel.

Source: MDL DV360 XBridge Data; MDL RFP 243 Google Ads Data.

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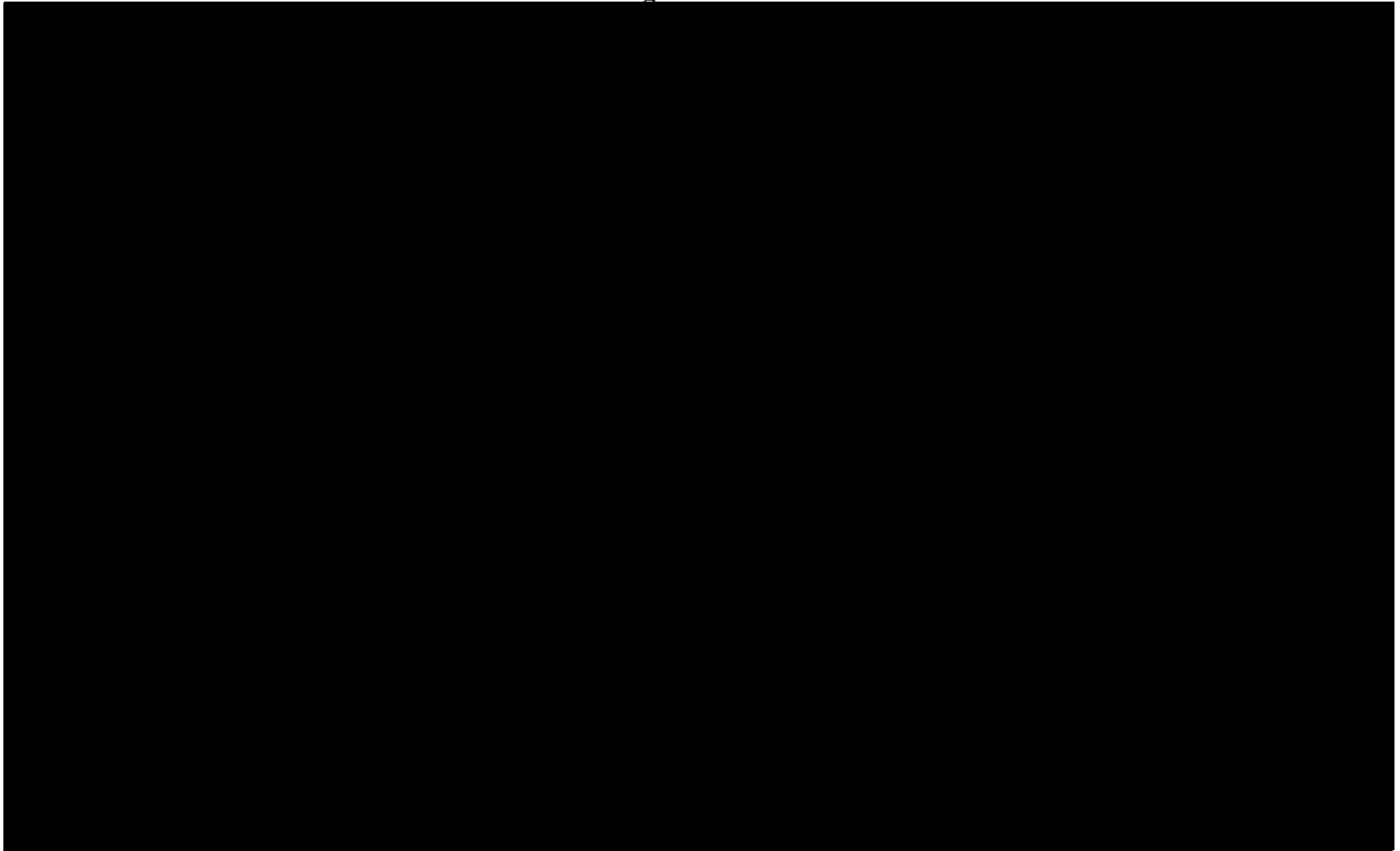


Notes: Click-Through Rate has been calculated as total clicks divided by impressions. Data have been limited to transactions where inventory\_source is “3PE,” “AdExchange,” or “Demand Product” and excludes transaction through Ad Sense.

Source: MDL RFP 243 Google Ads Data.

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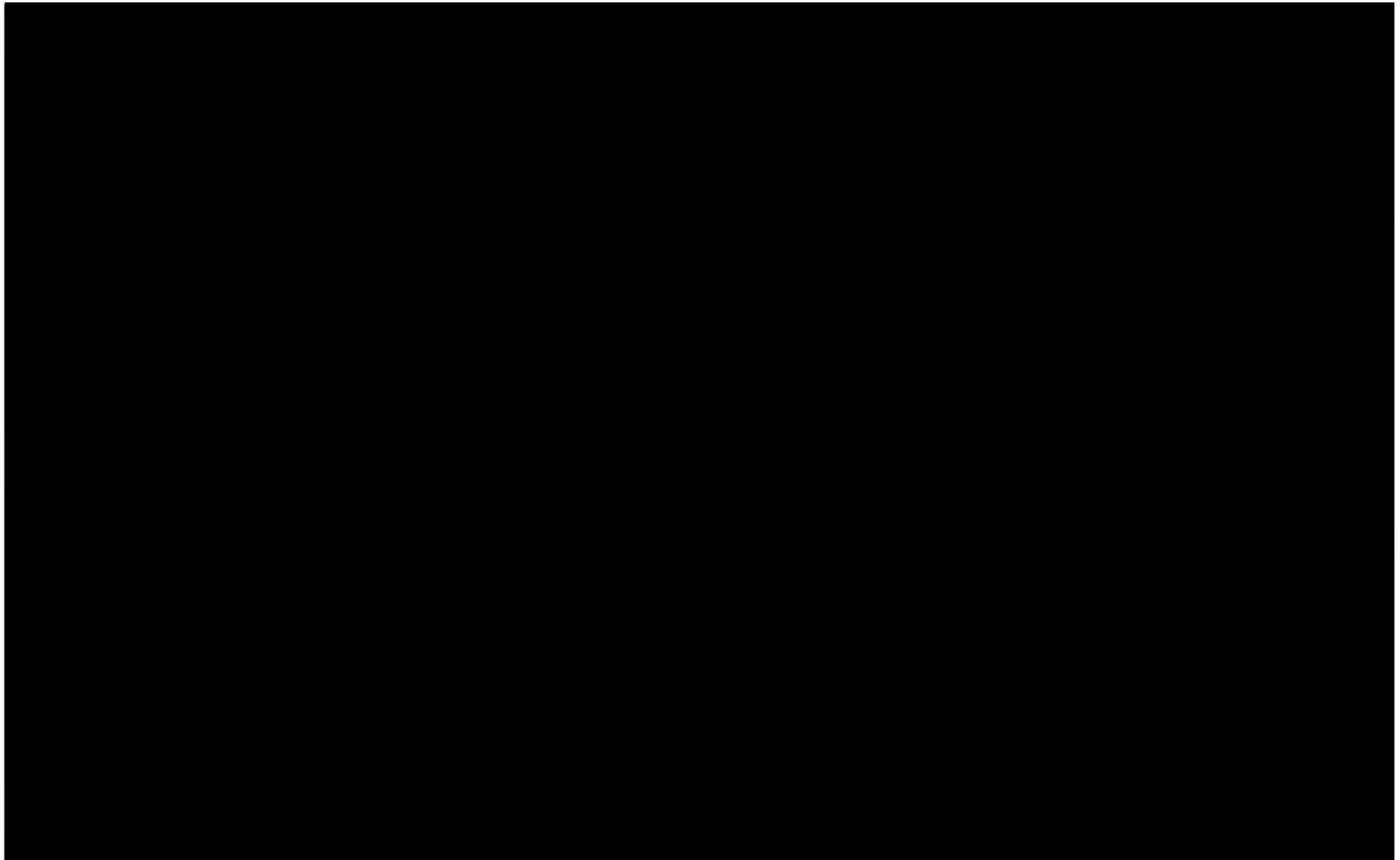
**Figure 102**



Notes: Data have been limited to transactions paid for on a CPC-basis where cost\_model is “cpc,” or “cpc\_to\_cpm.” Click-through rate has been calculated as total clicks divided by total impressions.

Source: MDL RFP 243 Google Ads Data.

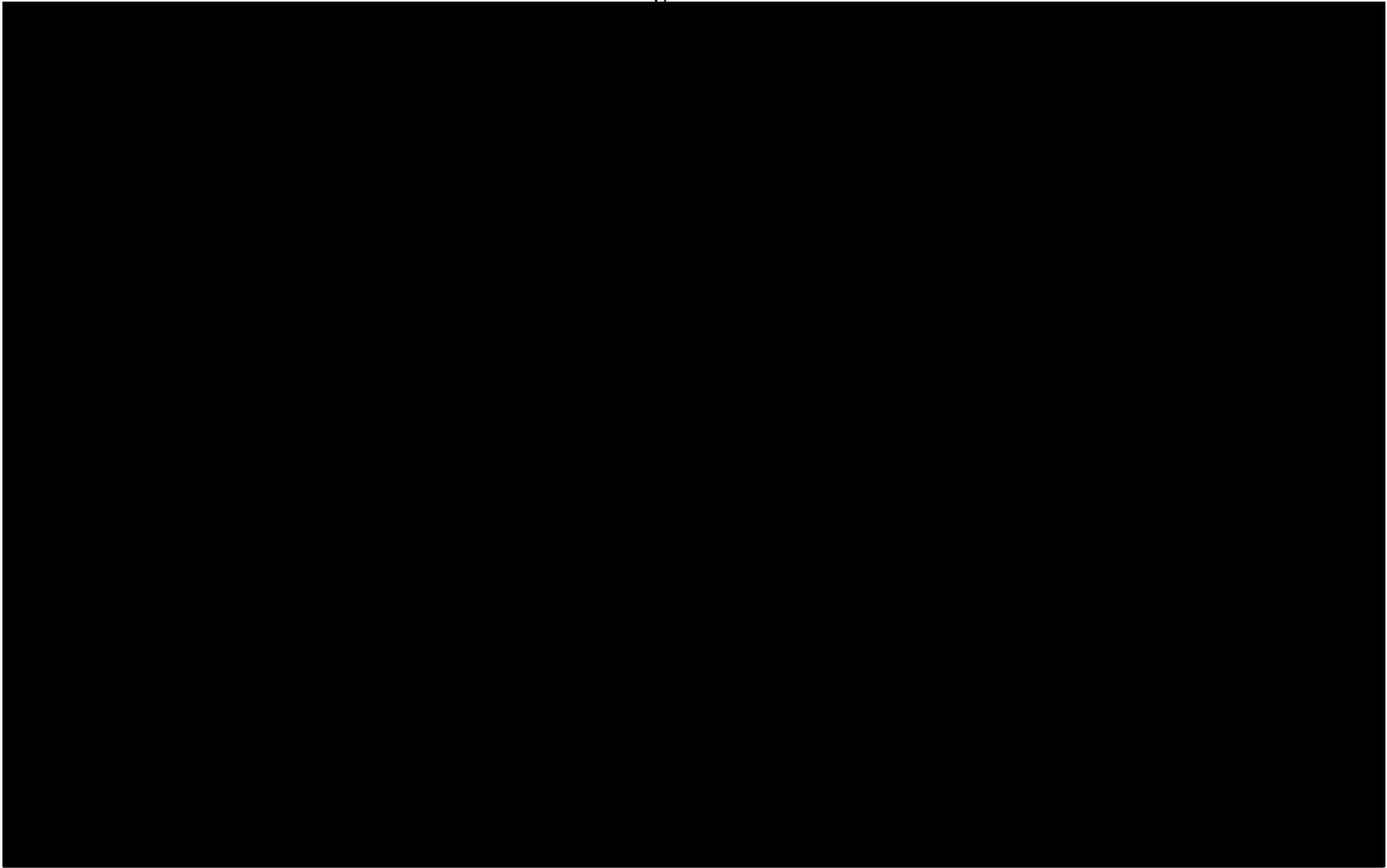
HIGHLY CONFIDENTIAL - SUBJECT TO PROTECTIVE ORDER



Notes: Click-through rate represents the number of times a digital ad was clicked on when it was shown to users. It has been calculated as total clicks divided by total impressions.  
Source: DOJ RFP 57 Autobidding Data.

HIGHLY CONFIDENTIAL - SUBJECT TO PROTECTIVE ORDER

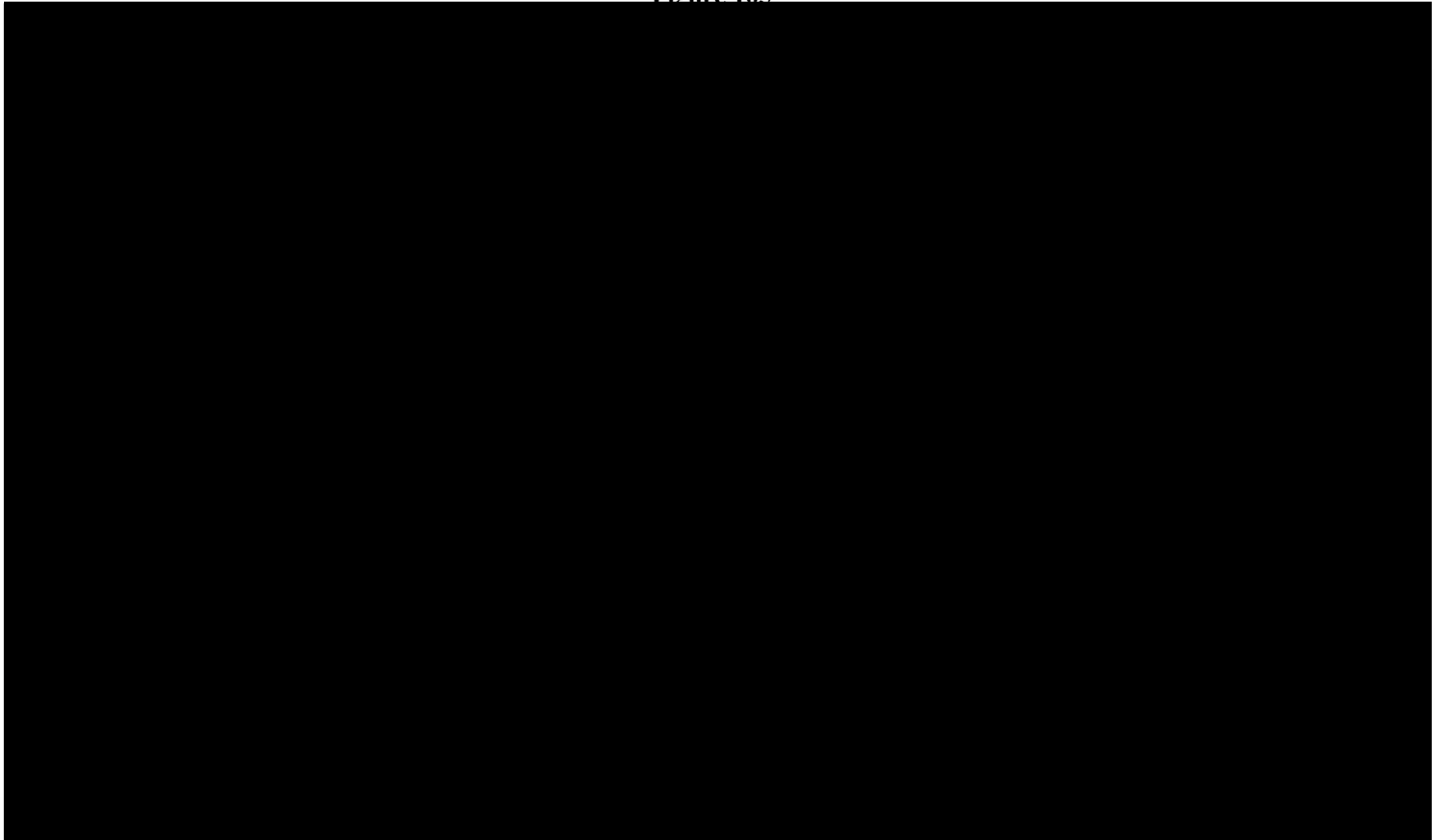
**Figure 104**



Notes: Click-through rate represents the number of times a digital ad was clicked on when it was shown to users. It has been calculated as total clicks divided by total impressions.  
Source: DOJ RFP 57 Autobidding Data.

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**Figure 105**

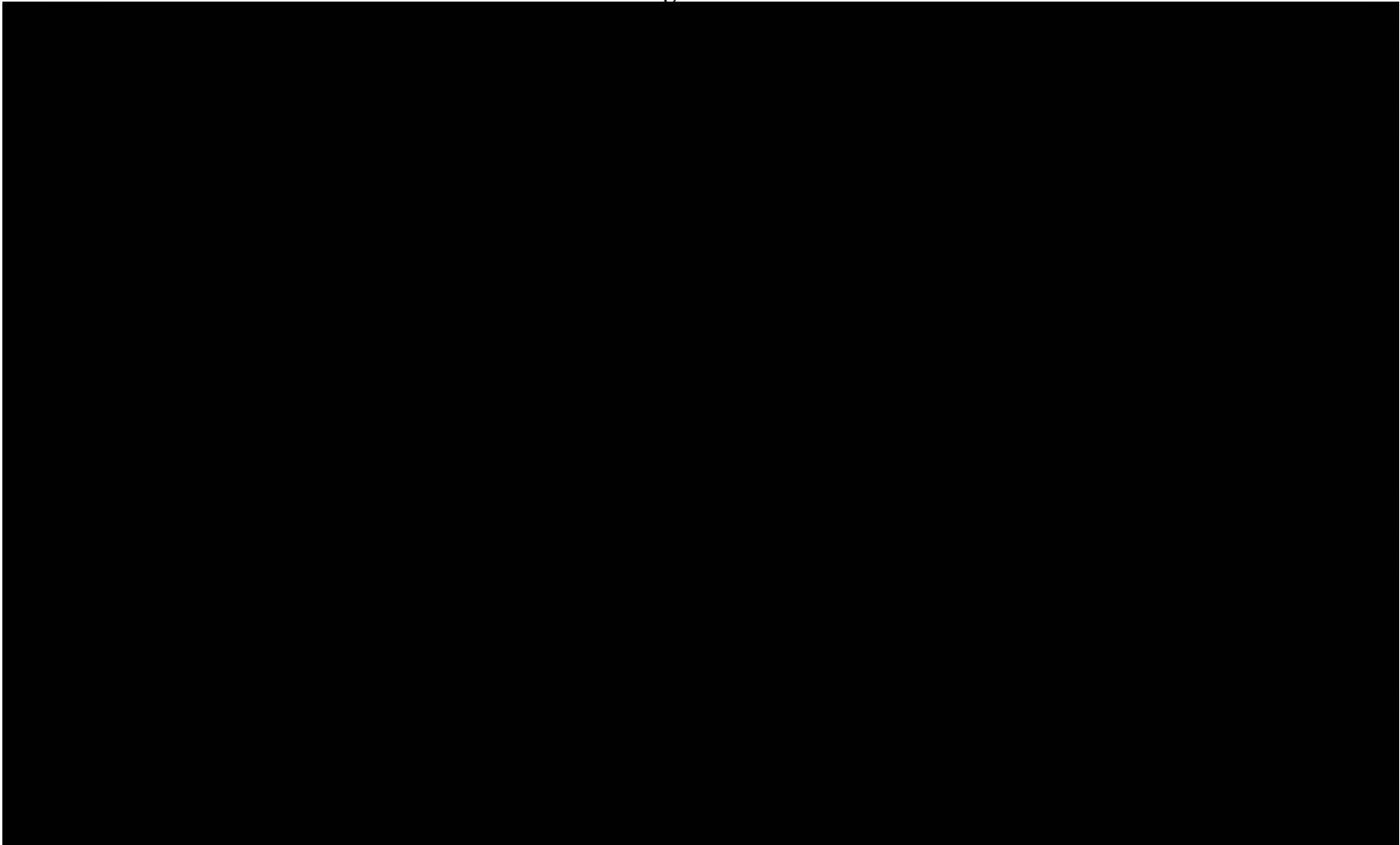


Notes: Cost-per-click represents the average price paid by advertisers for a click. It has been calculated as total ad spend divided by total clicks.

Source: DOJ RFP 57 Autobidding Data.

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**Figure 106**



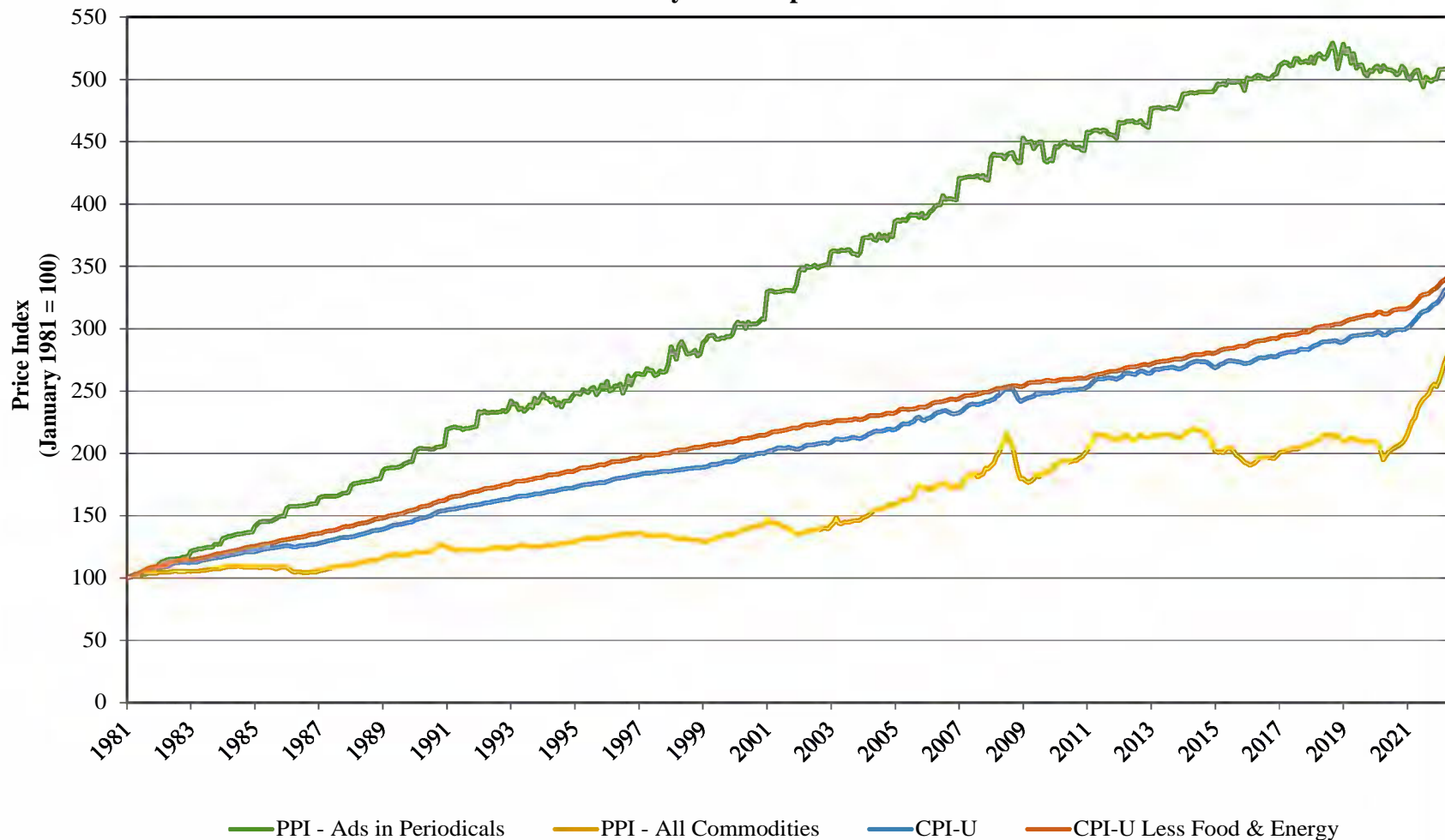
Notes: Conversions per dollar spent represents the average number of conversions per dollar spent by advertisers. It has been calculated as total conversions divided by total ad spend.

Source: DOJ RFP 57 Autobidding Data.



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**Figure 107**  
**PPI for Ads in Periodicals vs. Other Price Measures**  
**January 1981 - April 2022**

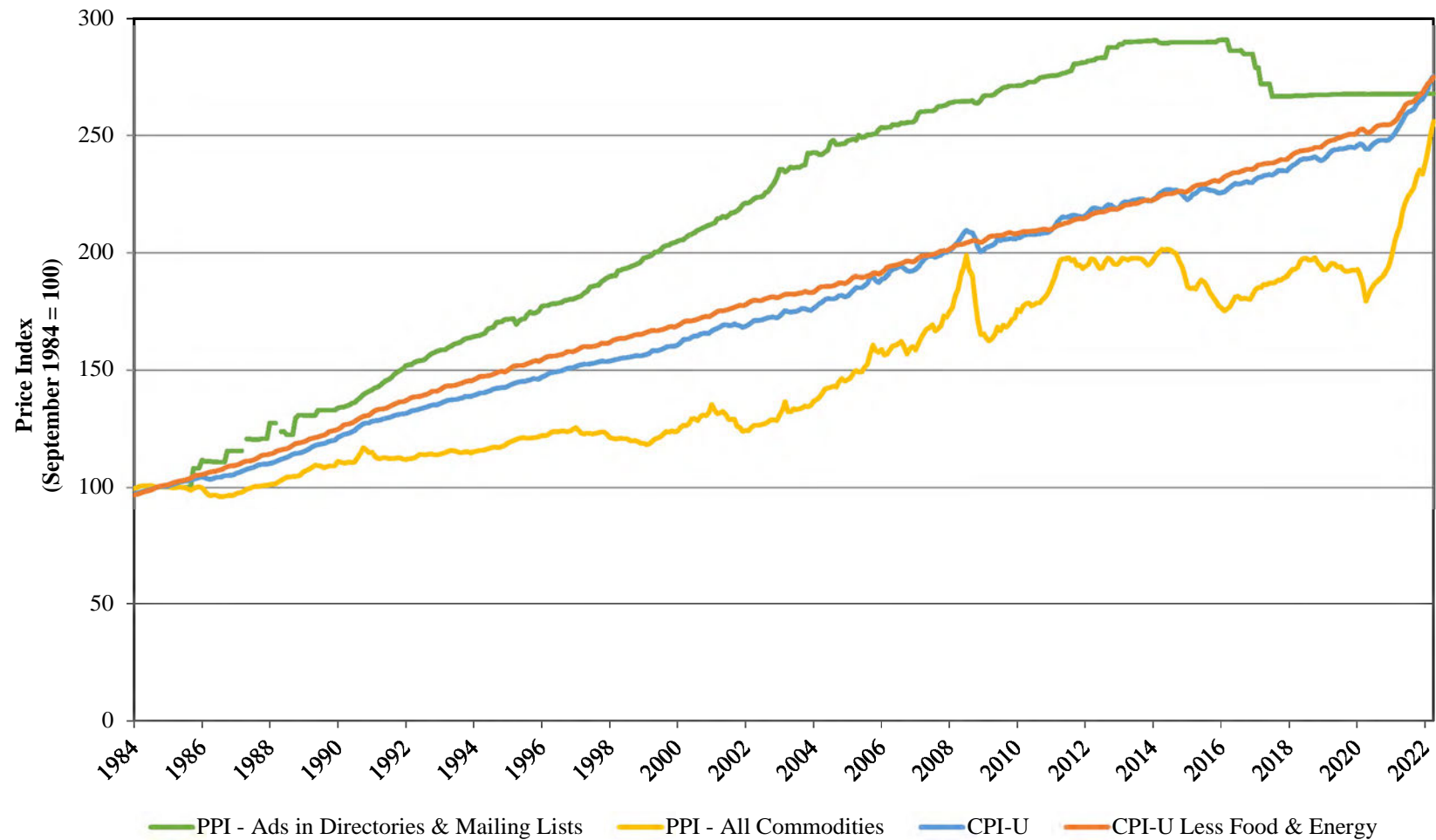


Notes: Advertising PPIs measure the average relative change in prices received by U.S. publishers for their ad inventory. Consumer price index CPI-U represents average changes to the cost of living for urban consumers. The periodical ad and all commodities PPI series are based on the BLS commodity survey. Series have not been seasonally adjusted but have been re-indexed to the common base period of January 1981.

Source: Bureau of Labor Statistics Price Index Data.

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**Figure 108**  
**PPI for Ads in Directories & Mailing Lists vs. Other Price Measures**  
**January 1984 - April 2022**

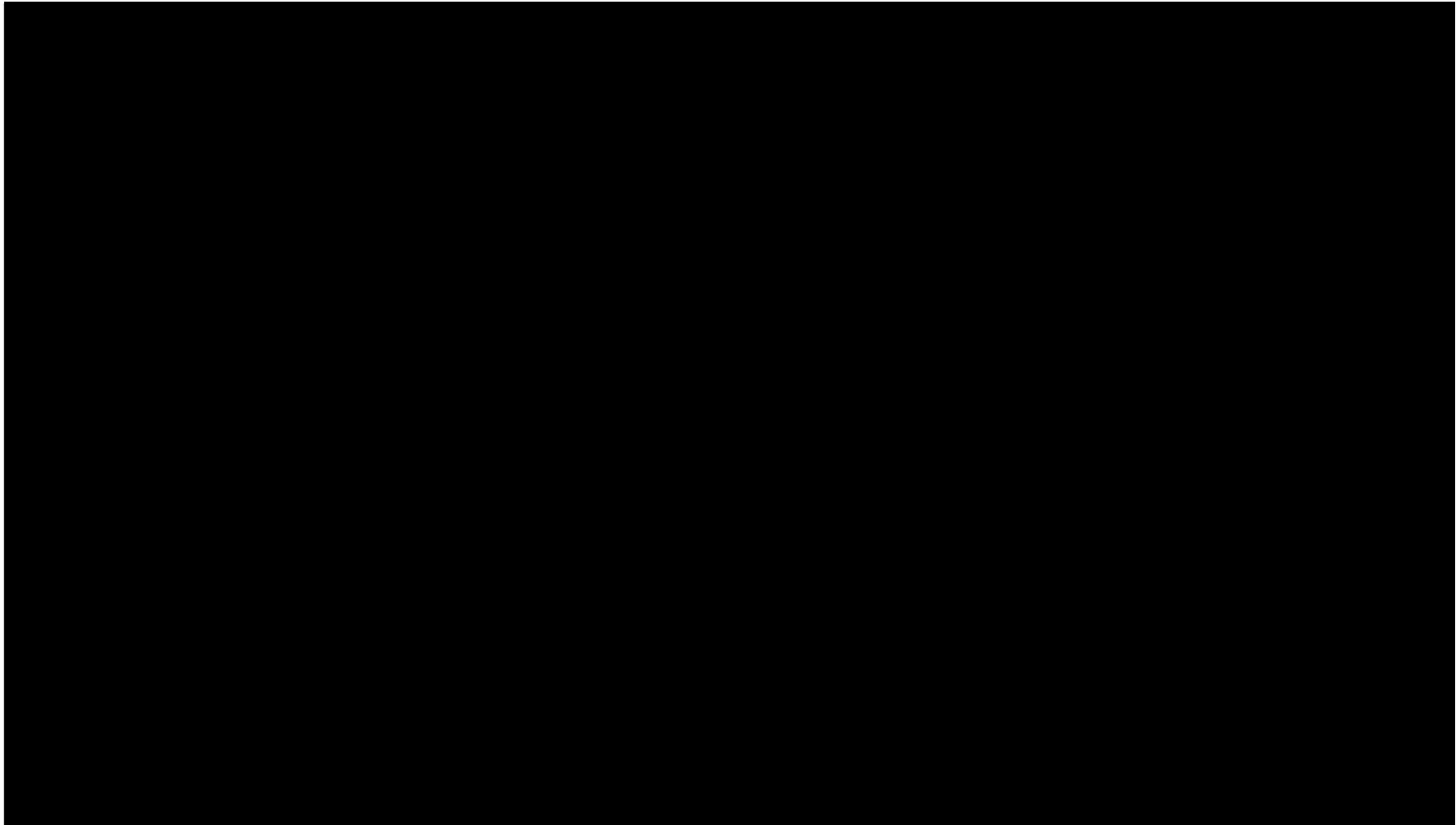


Notes: Advertising PPIs measure the average relative change in prices received by U.S. publishers for their ad inventory. Consumer price index CPI-U represents average changes to the cost of living for urban consumers. The directory/mailling list ad and all commodities PPI series are based on the BLS industry and commodity surveys respectively. Series have not been seasonally adjusted but have been re-indexed to the common base period of September 1984.

Source: Bureau of Labor Statistics Price Index Data.

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**Figure 109**

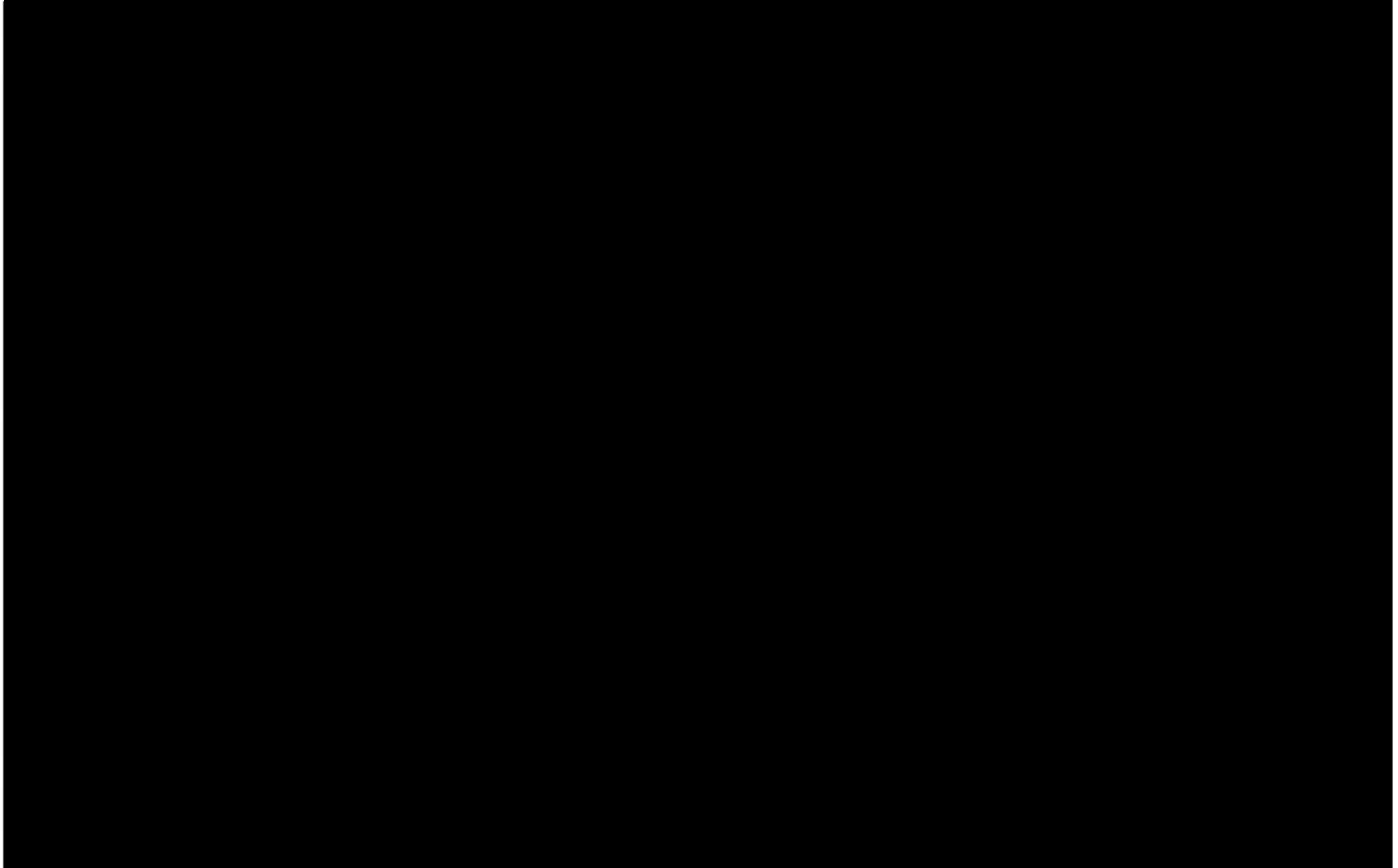


Notes: Total impressions represent the sum of invoiced and uninvoiced impressions for publishers. Total fees per thousand total impressions has been calculated as total fees divided by total impressions multiplied by 1,000. DFP fees were waived for publishers at the onset of the Covid-19 pandemic. Publishers were identified using the gfp\_network\_id field. Data does not allow for limitation to narrow display ads.

Source: DOJ RFP 57 DFP Fees Data; MDL RFP 243 AdX Data.

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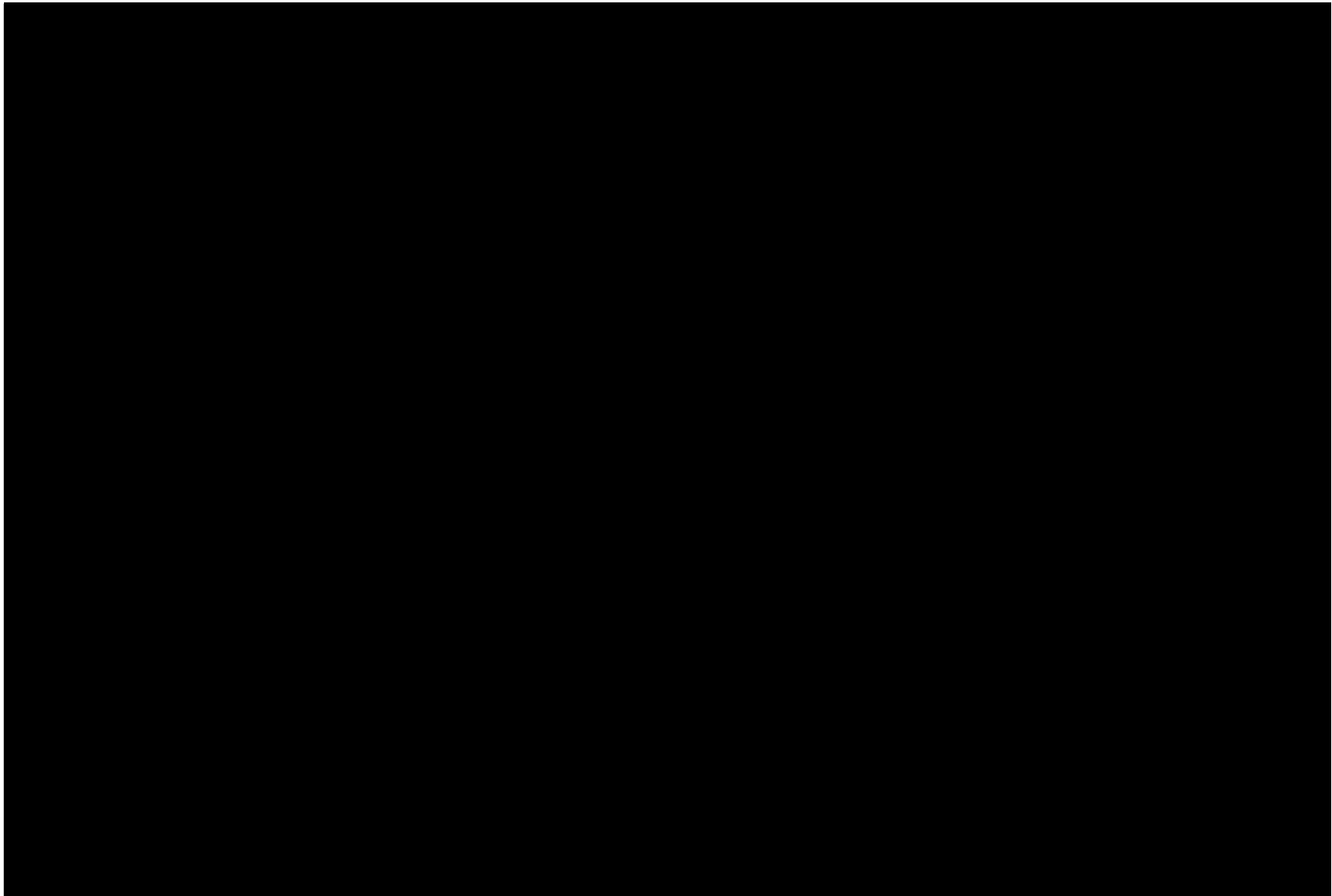
**Figure 110**



Notes: Data does not allow disaggregation of fees charged for mobile ads from narrow display ads.

Source: DOJ RFP 57 DFP Fees Data.

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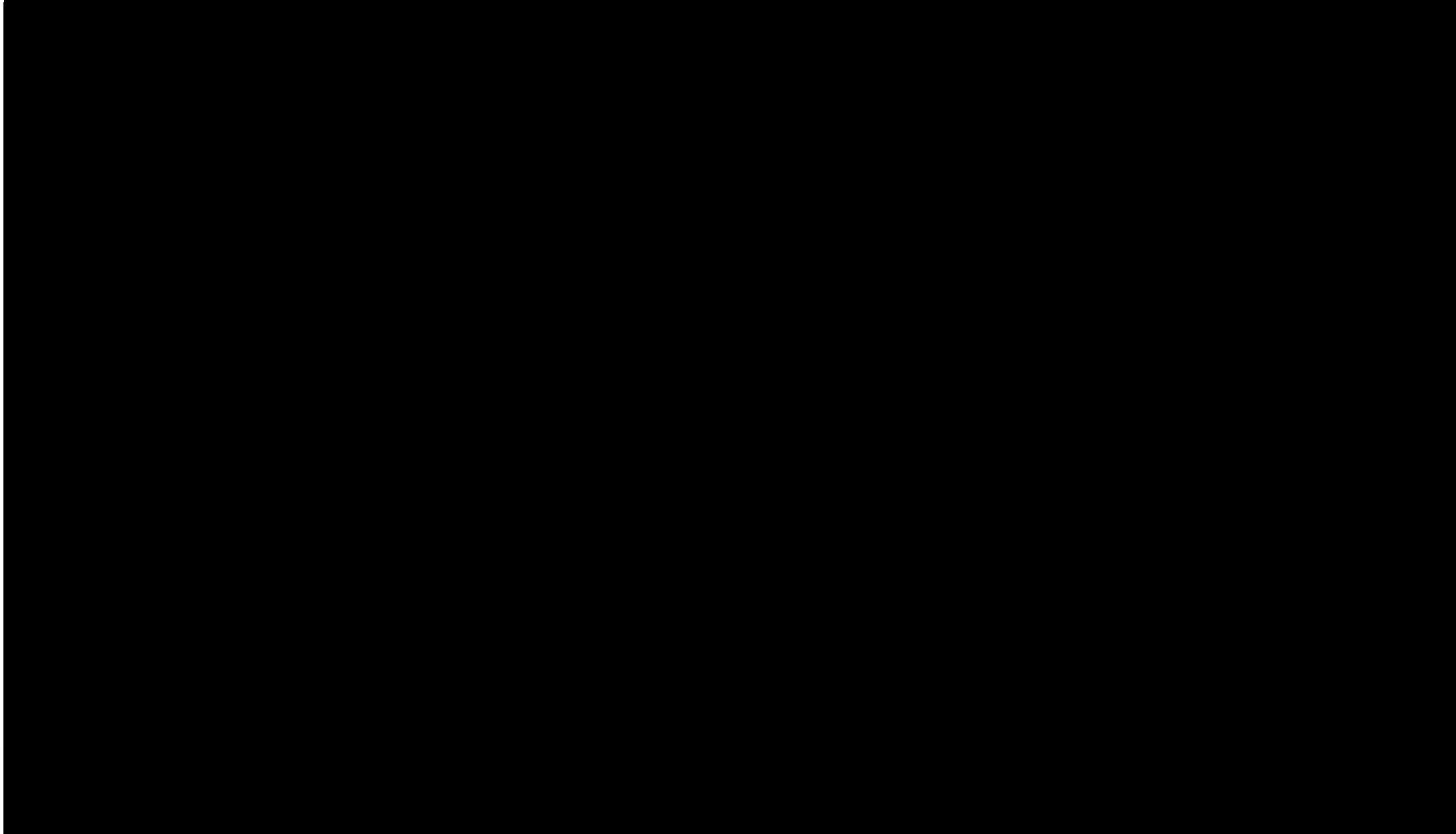


Notes: Limited to top 15 exchanges by cumulative impressions, with only the top 5 exchanges shown in color.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 112**  
**Publisher Revenue for Third-Party Exchanges through Open Bidding**  
**Limited to Display Ads (Narrow) Viewed by U.S. Users**  
**June 2018 - March 2023**



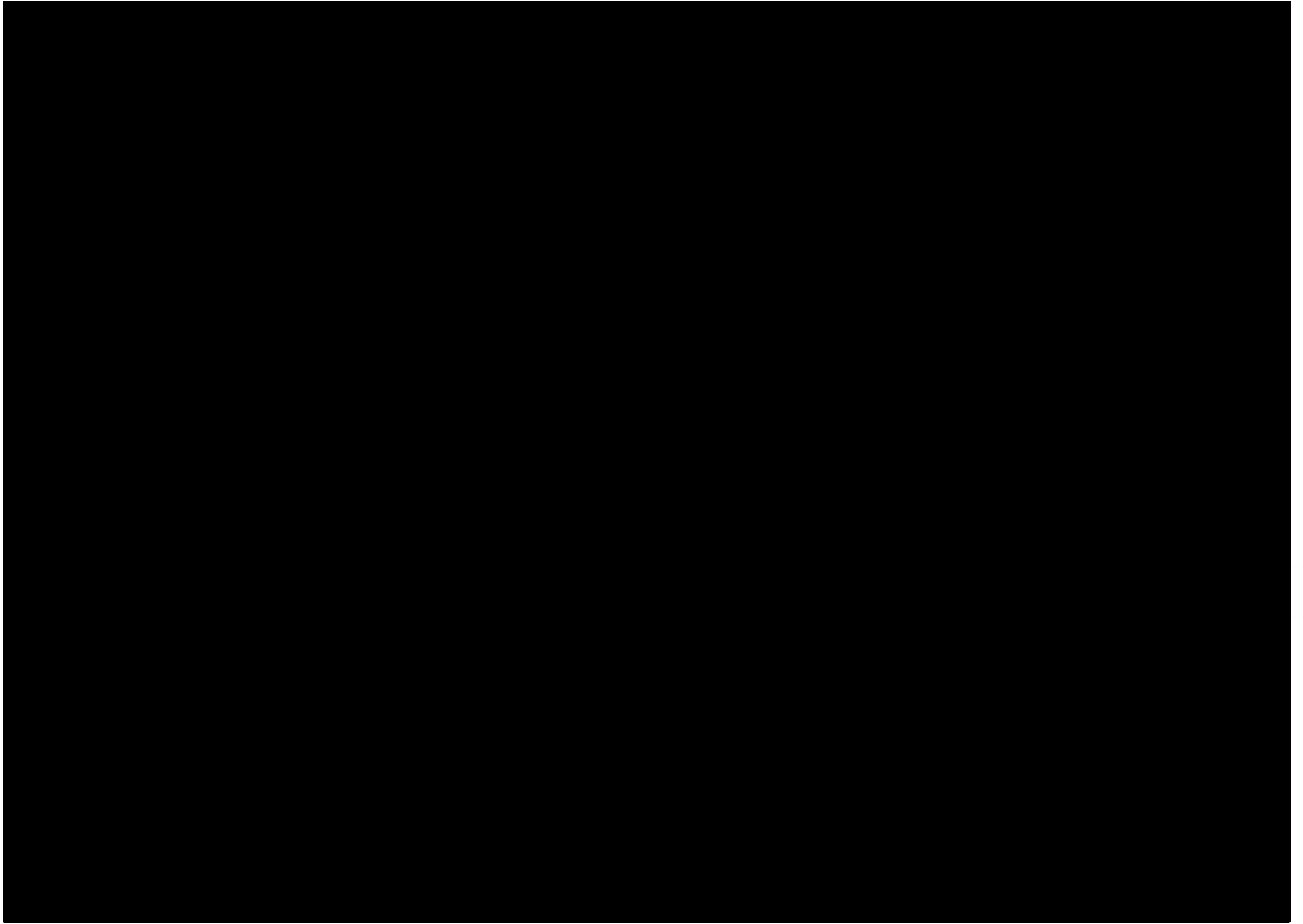
Notes: Limited to top 15 exchanges by cumulative impressions, with only the top 5 exchanges shown in color.

Source: MDL RFP 243 AdX Data.

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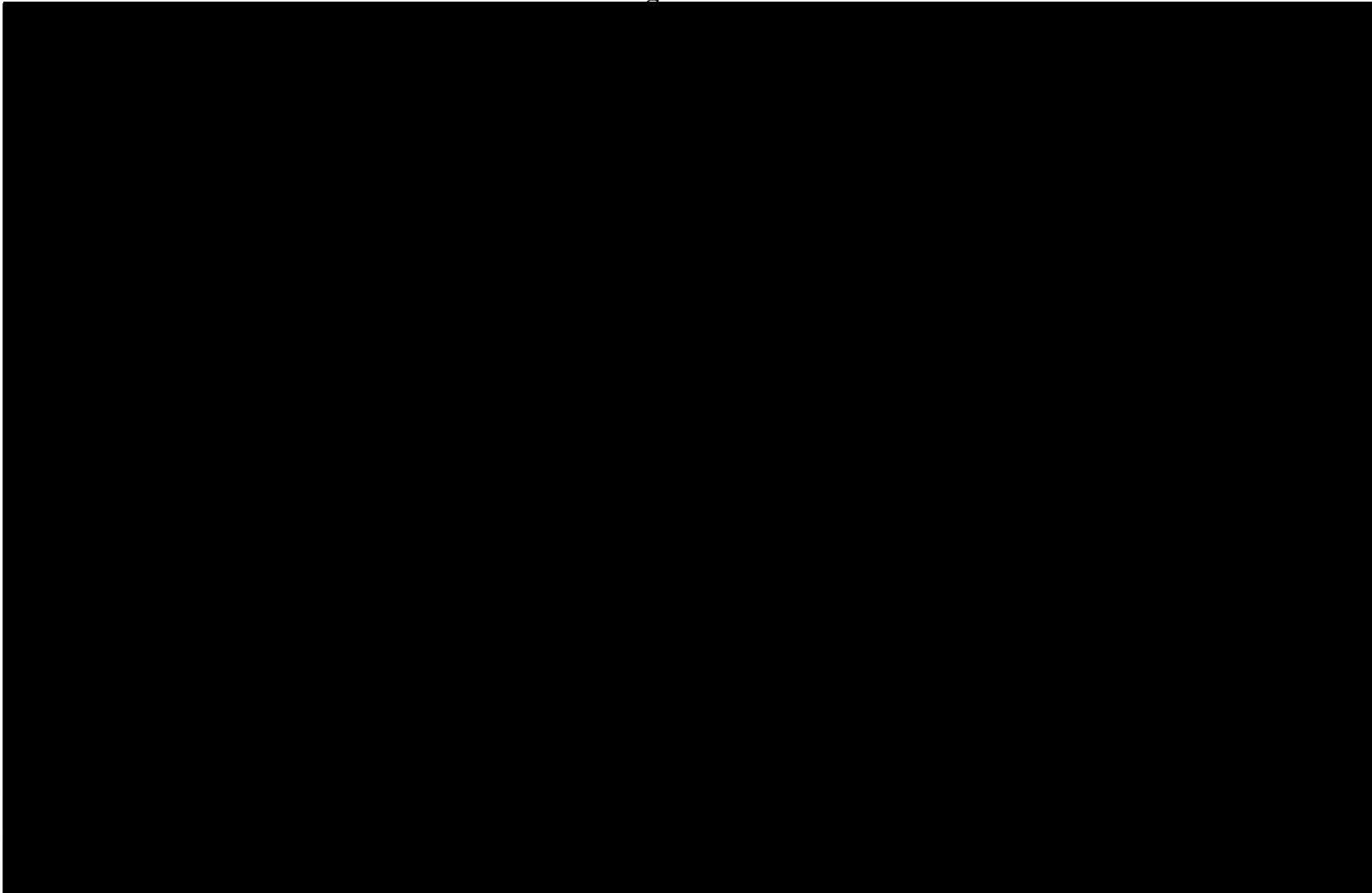
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**Figure 115**

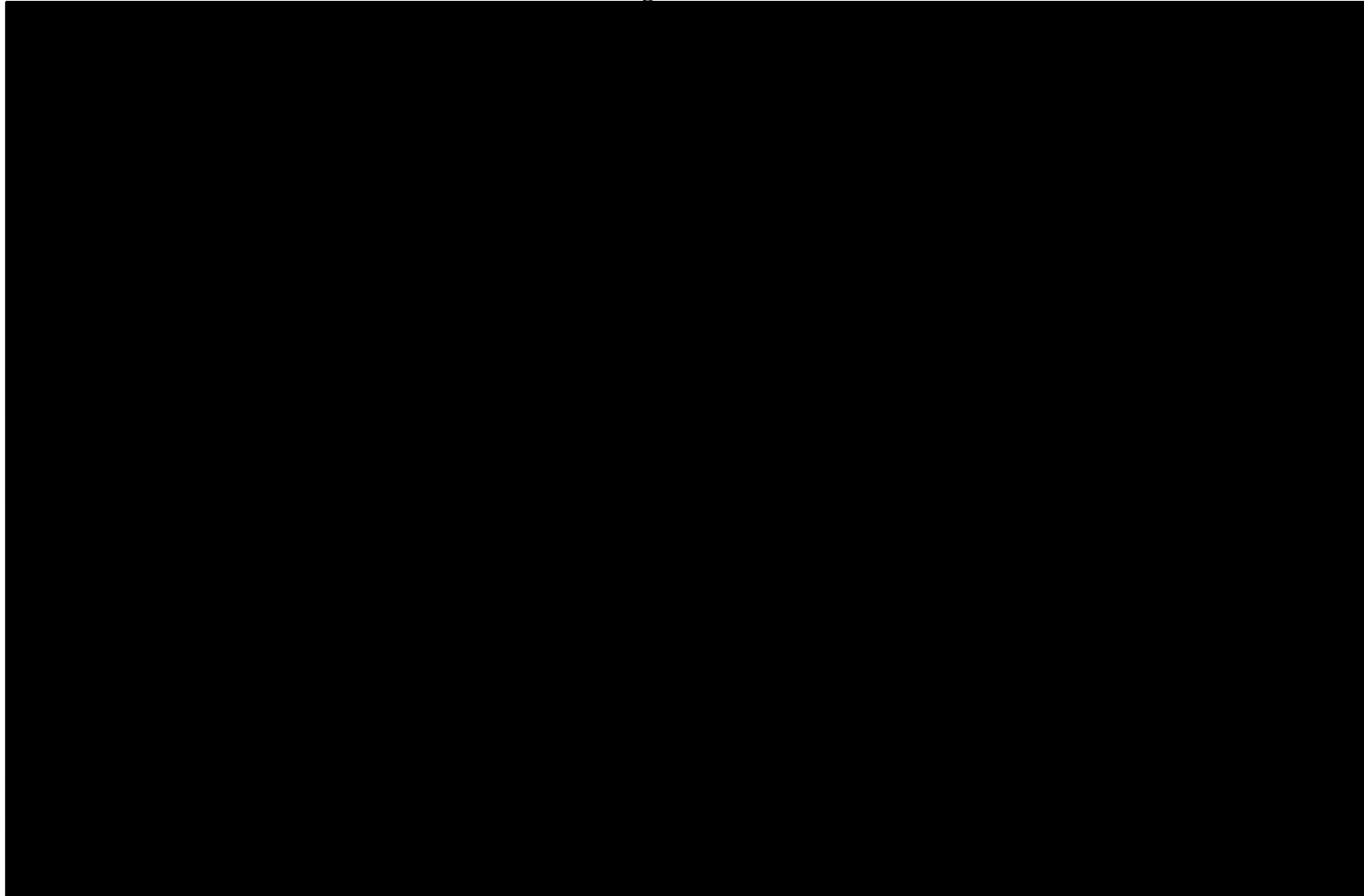


Notes: Limited to transactions where ad\_source\_type is "RTB: Real Time Bidders." Limited to top 25 ad tech businesses by cumulative impressions viewed by U.S. users, with only the top 5 ad tech businesses shown in color.

Source: MDL RFP 243 AdX Data.

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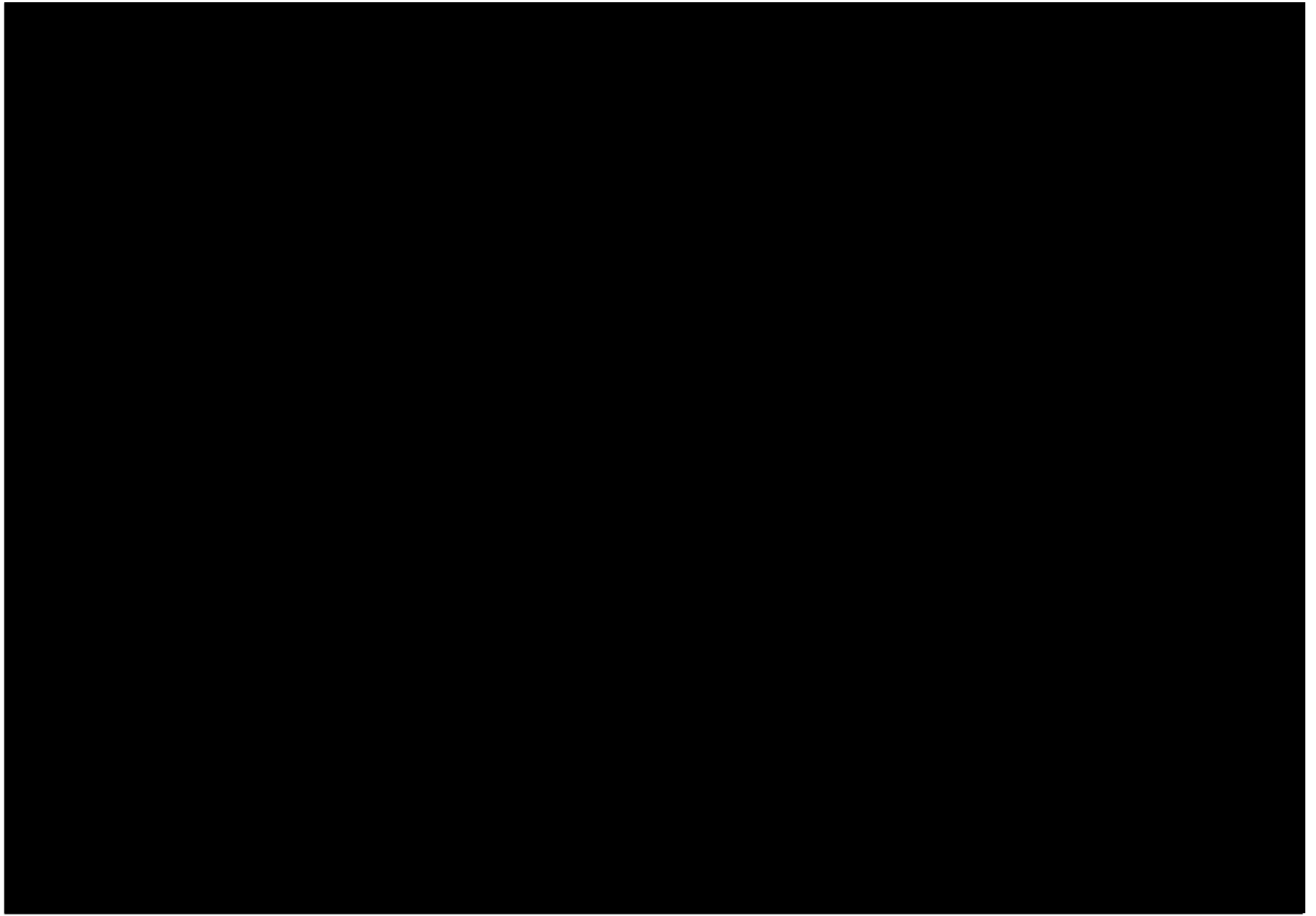
**Figure 116**



Notes: Limited to transactions where ad\_source\_type is "RTB: Real Time Bidders." Limited to top 25 ad tech businesses by cumulative impressions viewed by U.S. users, with only the top 5 ad tech businesses shown in color.

Source: MDL RFP 243 AdX Data.

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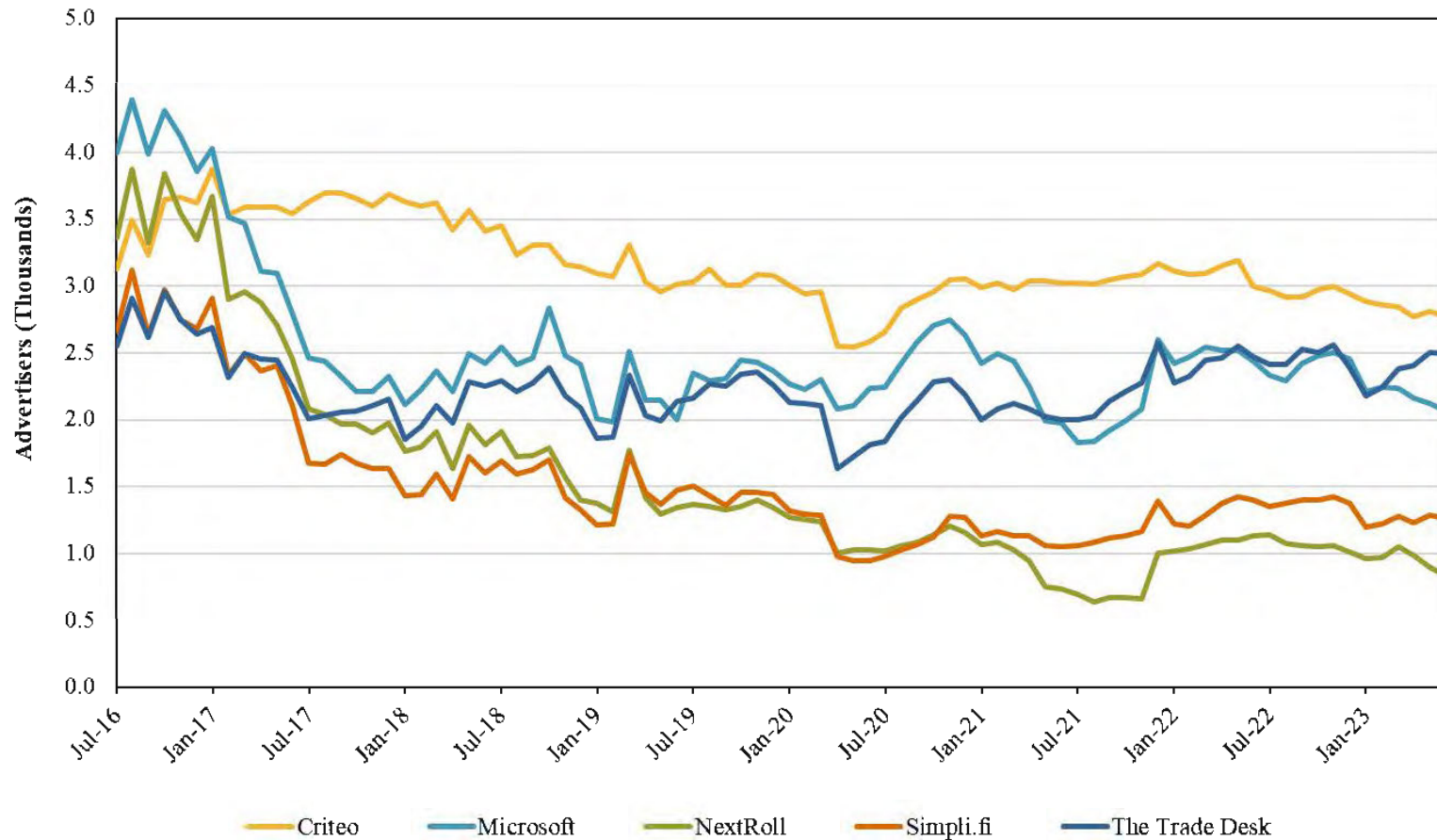


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**Figure 119**  
**Number of Advertisers Bidding into AdX by DSP**  
**Limited to Top Five DSPs by Count of Distinct Advertisers**  
**July 2016 - June 2023**

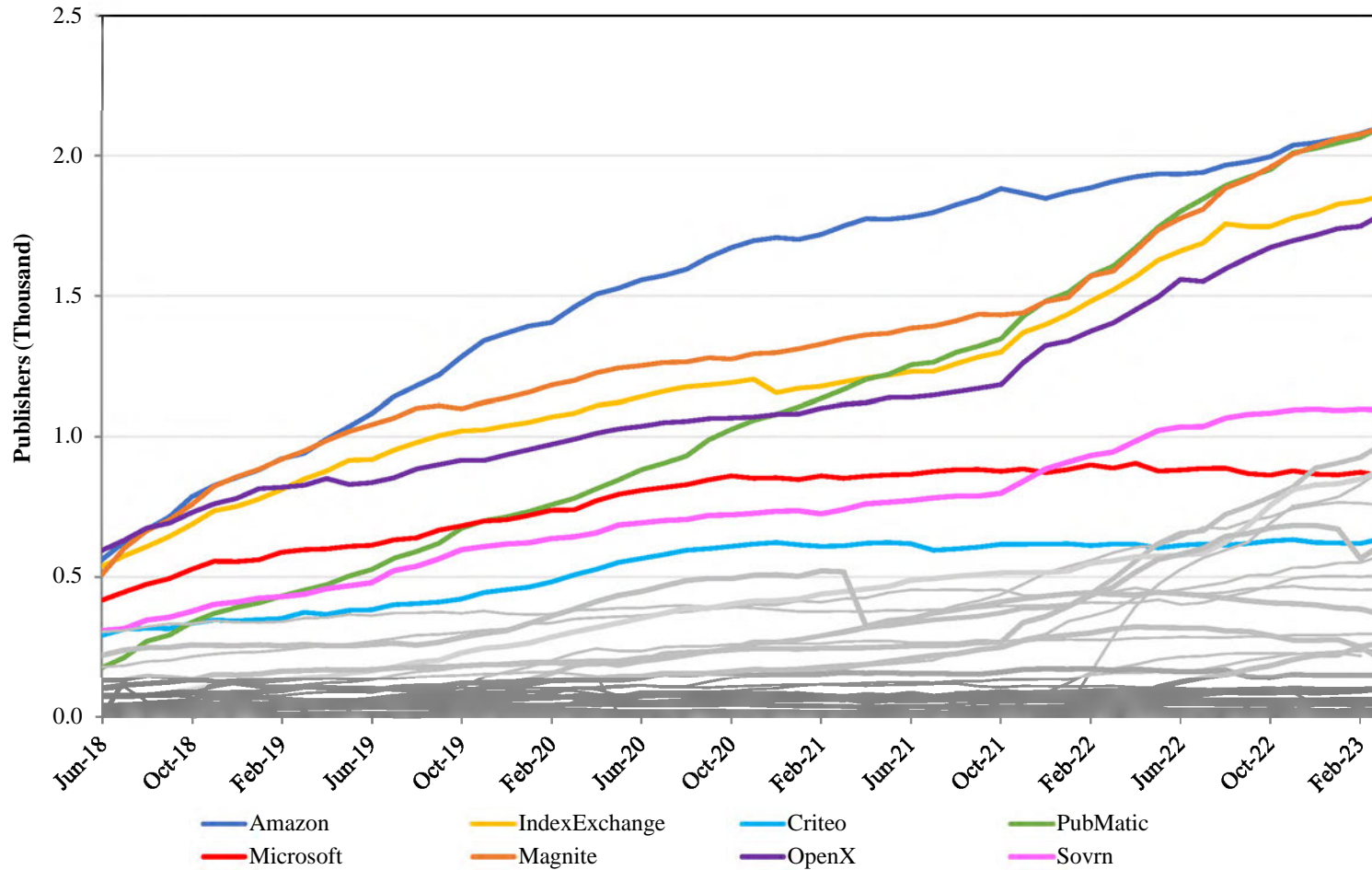


Notes: Limited to top five DSPs by total count of unique advertisers utilizing the DSP over the entire time period. Observations with ad source type "No Ad," advertiser ID "0," or buyer network ID "0" have been excluded. Advertisers with 0 or less ad spend on narrow display ads have been excluded. Data have been limited to U.S. transactions.

Source: DOJ RFP 57 DRX Internal Stats Data.

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**Figure 120**  
**Number of AdX and DFP Publishers Using Each Third-Party Open Bidding and Header Bidding Exchange**  
**June 2018 - March 2023**

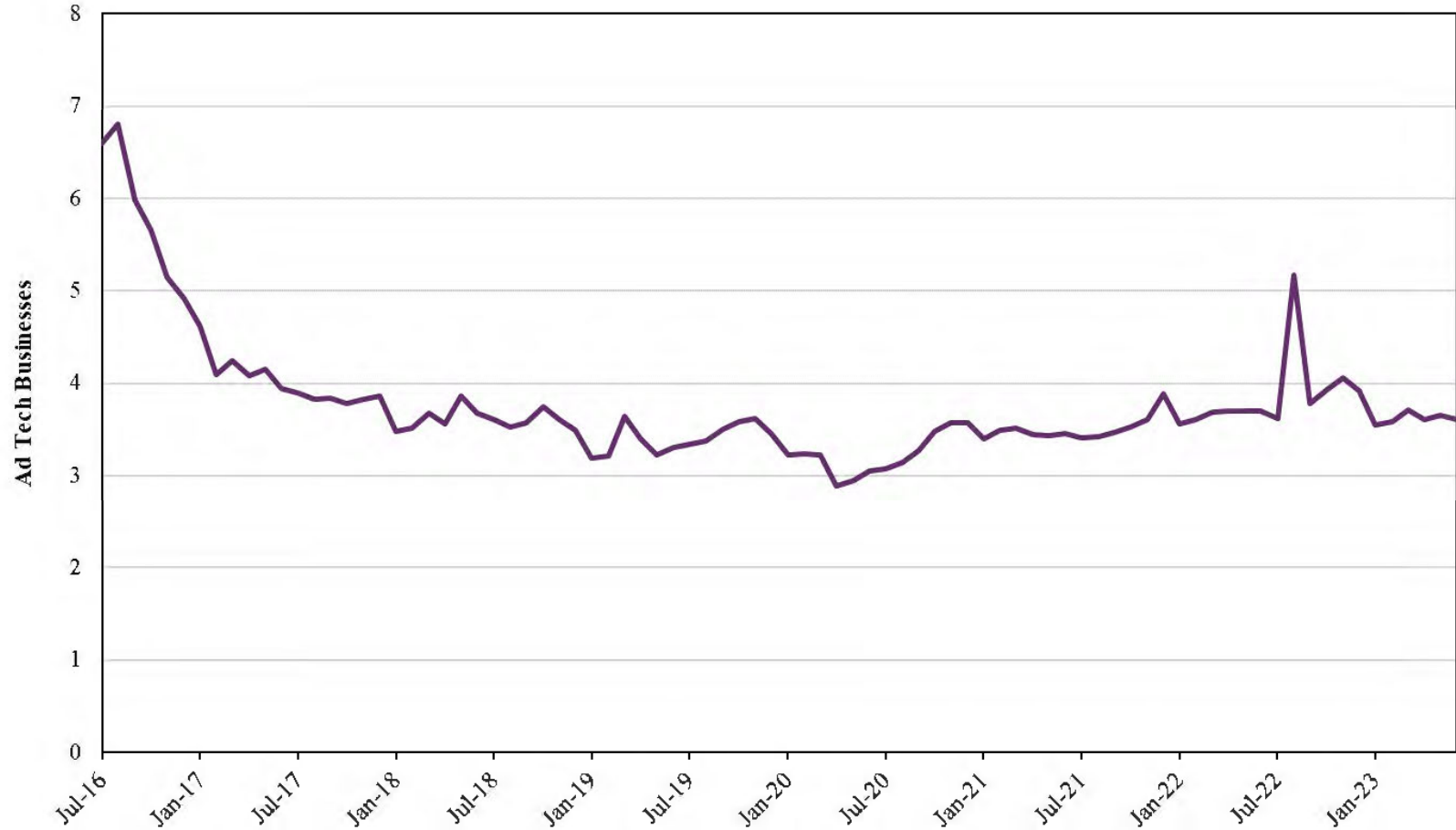


Notes: AdX and Unknown exchanges are excluded. Limited to exchanges that transact impressions viewed by users in the U.S. The top 8 exchanges in terms of publisher count are highlighted in the legend.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 121**  
**Average Number of Ad Tech Businesses Utilized By Advertisers to Bid into AdX**  
**July 2016 - June 2023**

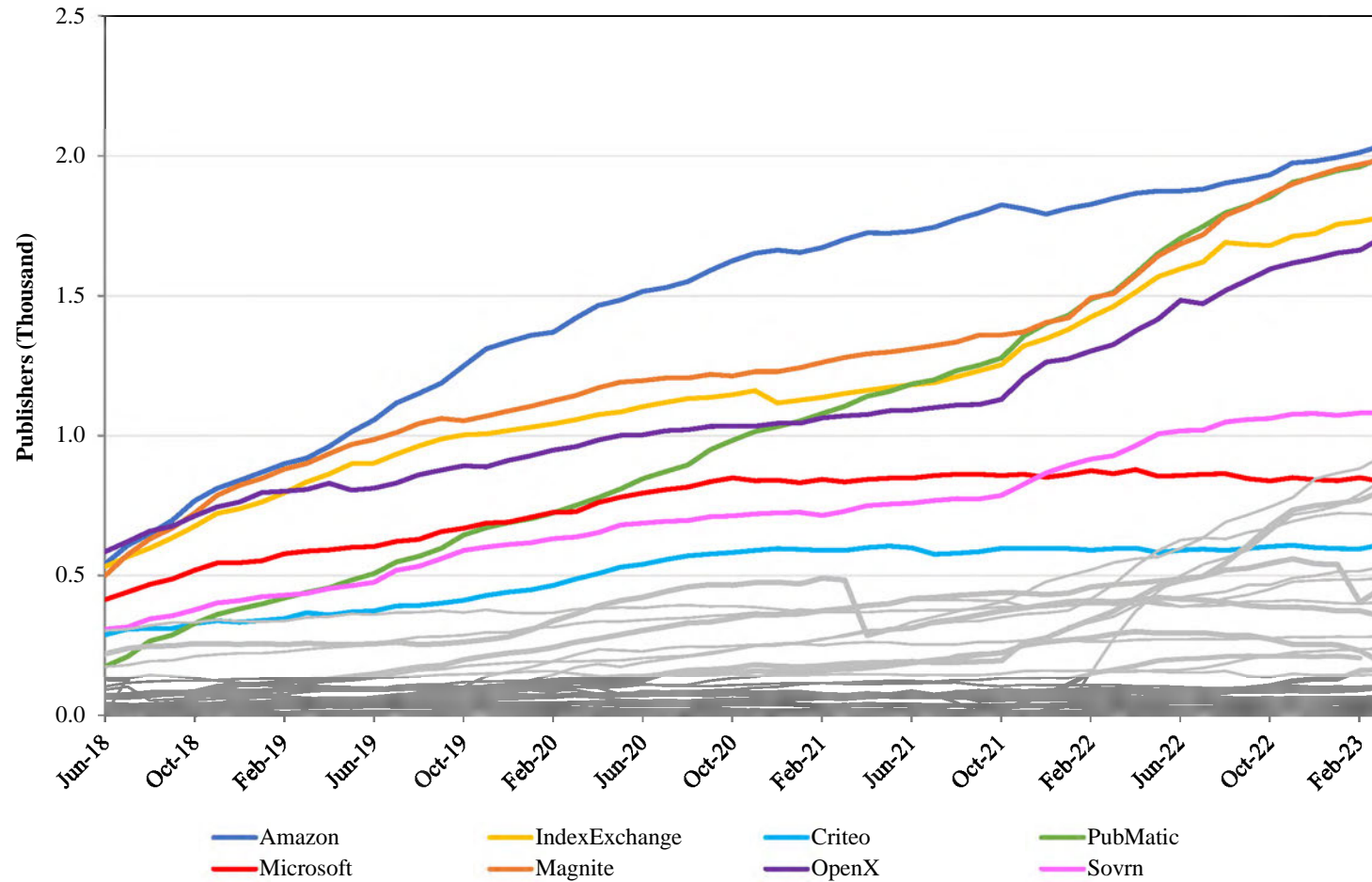


Notes: Observations with ad source type “No Ad”, advertiser ID “0,” or buyer network ID “0” have been excluded. Advertisers with no spend on display ads (narrow) have been excluded.

Source: DOJ RFP 57 DRX Internal Stats Data.

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**Figure 122**  
**Number of AdX and DFP Publishers Using Each Third-Party Open Bidding and Header Bidding Exchange to Transact Display Ads (Narrow)**  
**June 2018 - March 2023**



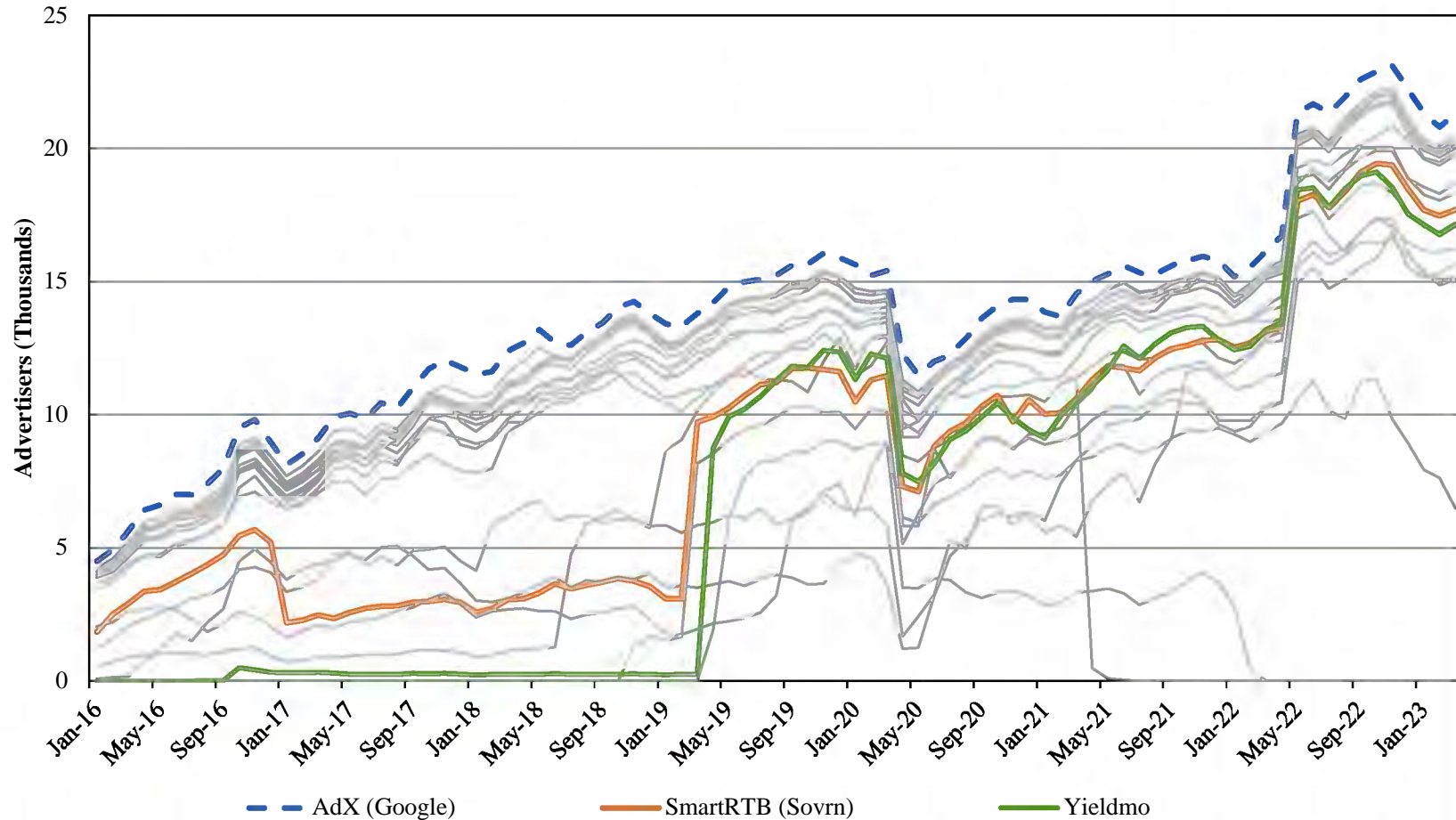
Notes: AdX and Unknown exchanges are excluded. Limited to exchanges that transact impressions viewed by users in the U.S. The top 8 exchanges in terms of publisher count are highlighted in the legend.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.



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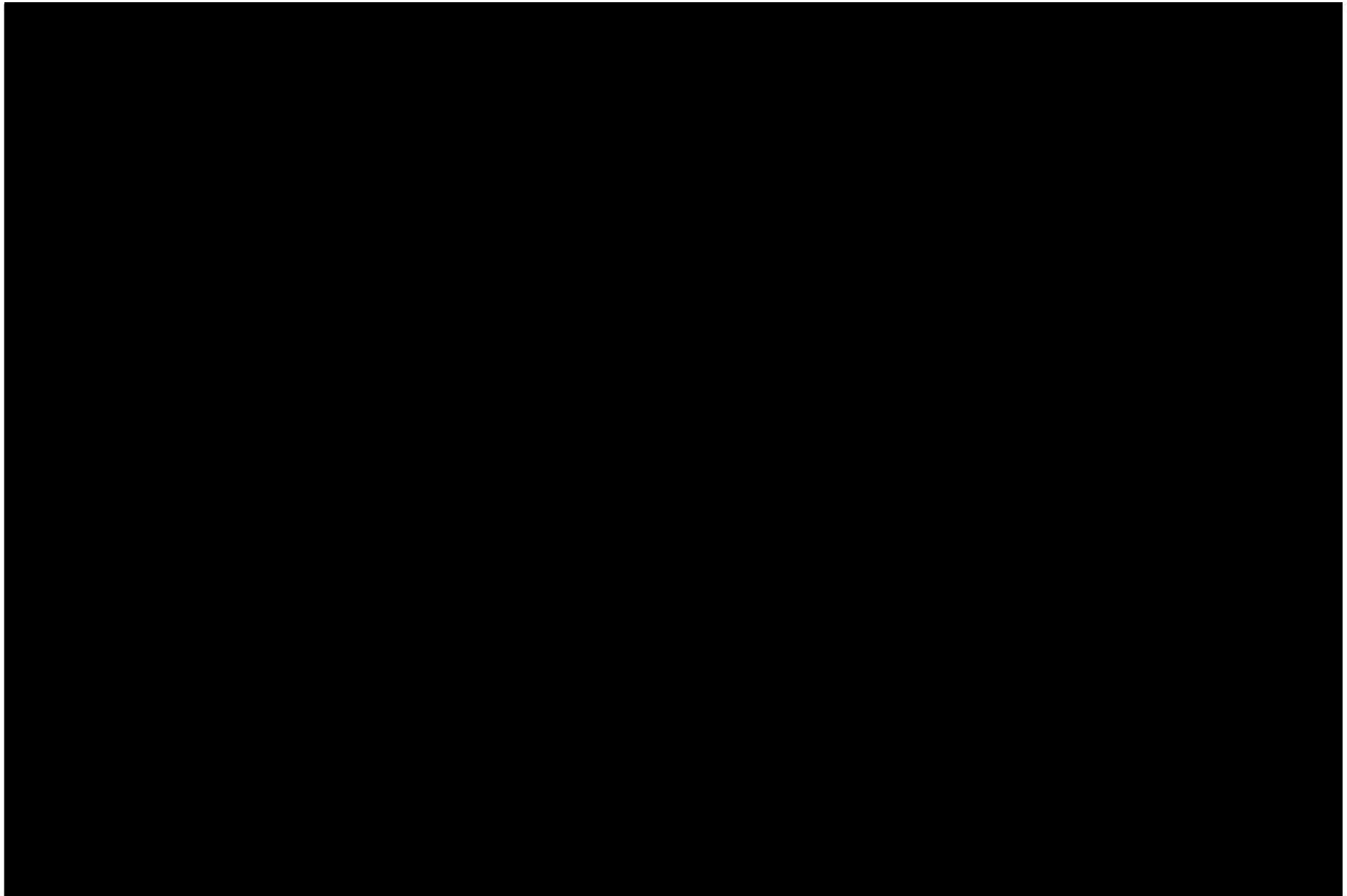
**Figure 123**  
**Number of U.S. Advertisers on DV360 Transacting with Each of the Top Twenty Ad Exchanges**  
**January 2016 - March 2023**



Notes: Values represent the number of U.S. advertisers on DV360 transacting with a given ad exchange in a given month. Data are limited to the top twenty ad exchanges in DV360 data in terms of the number of advertisers each transacts with over the entire January 2016 to March 2023 period. Data are only limited by U.S. geography and ad exchange, they are not limited by ad format or other factors.

Source: MDL RFP 243 DV360 Data.

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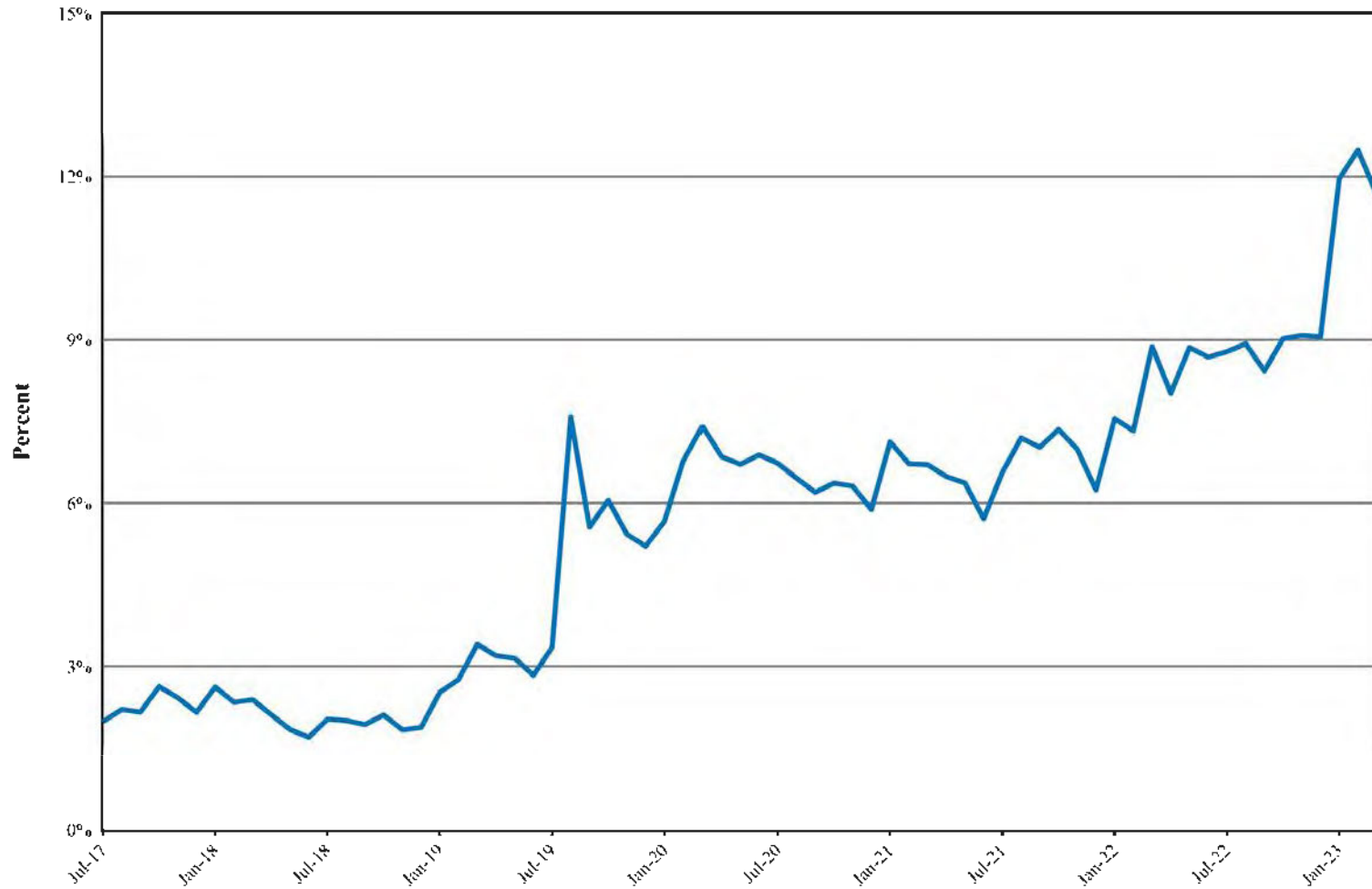


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**Figure 126**  
**Share of AdX Publishers Setting Manual or Automatic Blocks, Limited To Digital Ads Viewed by U.S. Users**  
**July 2017 - March 2023**



Notes: Data are limited to publishers selling display ads (narrow) viewed by U.S. users.

Source: MDL RFP 243 AdX Data; ARC Data.

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**Figure 127**  
**Google Authorized Buyer Health Data**  
**Bid Request Outcomes by Buyer Type**  
**February 26, 2023 - August 25, 2023**

Bid Request Outcome	Buyer Type: Open Bidding Exchanges		Buyer Type: Non-Google AdX Bidders		Overall	
	---(Count in Billions)---	---(Percent)---	---(Count in Billions)---	---(Percent)---	---(Count in Billions)---	---(Percent)---
	(a)	(b)	(c)	(d)	(e) (a)+(c)	(f)
<b><u>Filtered Outcomes</u></b>						
<b><u>Google-Filtered</u></b>						
Bid Endpoint Unconfigured	175,841	4.32 %	253	0.15 %	176,094	4.15 %
Missing Secure Signal	82,743	2.03	7,920	4.72	90,663	2.14
Missing Required SDK	71,677	1.76	1,117	0.67	72,793	1.72
High Response Error Rate	38,977	0.96	893	0.53	39,870	0.94
Callout Status Error	2,869	0.07	575	0.34	3,444	0.08
Unsupported SDK Render	175	0.00	147	0.09	322	0.01
No Placement In Request	56	0.00	0	0.00	56	0.00
Internal Error	31	0.00	1	0.00	32	0.00
Missing App ID	26	0.00	8	0.00	34	0.00
<b>Subtotal:</b>	<b>372,393</b>	<b>9.14 %</b>	<b>10,914</b>	<b>6.50 %</b>	<b>383,308</b>	<b>9.04 %</b>
<b><u>Publisher-Filtered</u></b>						
LGPD Eligibility	9,669	0.24 %	1	0.00 %	9,671	0.23 %
Bidder Ineligible On NPA	0	0.00	42	0.02	42	0.00
<b>Subtotal:</b>	<b>35,434</b>	<b>0.87 %</b>	<b>276</b>	<b>0.16 %</b>	<b>35,710</b>	<b>0.84 %</b>
<b><u>Bidder-Filtered</u></b>						
Pre-Targeting Quota	1,209,292	29.69 %	0	0.00 %	1,209,292	28.51 %
Out of Quota	1,151,677	28.27	16,679	9.93	1,168,355	27.55
User Identifier Needed	452,068	11.10	3,432	2.04	455,499	10.74
<b>Subtotal:</b>	<b>2,813,036</b>	<b>69.06 %</b>	<b>20,110</b>	<b>11.98 %</b>	<b>2,833,147</b>	<b>66.80 %</b>
<b><u>User-Filtered</u></b>						
User Consent Settings	271,153	6.66 %	1,571	0.94 %	272,724	6.43 %
U.S. Privacy Settings	0	0.00 %	0	0.00 %	0	0.00 %
<b>Subtotal:</b>	<b>271,153</b>	<b>6.66 %</b>	<b>1,571</b>	<b>0.94 %</b>	<b>272,724</b>	<b>6.43 %</b>
<b><u>Miscellaneous-Filtered</u></b>						
Status Unknown	2,825	0.07	195	0.12	3,021	0.07
<b>Filtered Request Total:</b>	<b>3,494,842</b>	<b>85.79 %</b>	<b>33,067</b>	<b>19.69 %</b>	<b>3,527,910</b>	<b>83.18 %</b>
<b><u>All Outcomes</u></b>						
Request Filtered	3,494,842	85.79 %	33,067	19.69 %	3,527,910	83.18 %
No Bid Received	534,944	13.13	127,481	75.92	662,425	15.62
Bid Received - Auction Not Won	41,566	1.02	5,744	3.42	47,883	1.13
Bid Received - Auction Won	2,196	0.05	1,235	0.74	3,431	0.08
<b>Bid Request Total:</b>	<b>4,073,548</b>	<b>100.00 %</b>	<b>167,914</b>	<b>100.00 %</b>	<b>4,241,462</b>	<b>100.00 %</b>

Notes: Request Filtered in the "All Outcomes" subtable reflect the total of all filtered outcomes as summed above. "No Bid Received" is calculated using bid\_responses\_without\_a\_bid. Data have not been filtered or limited.

Source: DOJ RFP 57 Corrected Bidder Behavior Data.

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**Figure 128**  
**Google Authorized Buyer Health Data**  
**Bid Response Outcomes by Buyer Type**  
**February 26, 2023 - August 25, 2023**

Bid Outcome	Buyer Type: Open Bidding Exchanges		Buyer Type: Non-Google AdX Bidders		Overall	
	---(Count in Billions)---	---(Percent)---	---(Count in Billions)---	---(Percent)---	---(Count in Billions)---	---(Percent)---
	(a)	(b)	(c)	(d)	(e) (a)+(c)	(f)
<b><u>Filtered Outcomes</u></b>						
<b><u>Google-Filtered</u></b>						
Creative Disapproved	258	0.58 %	28	0.40 %	286	0.56 %
Ad Policy Violation	0	0.00	0	0.00	0	0.00
Excluded Attribute	88	0.20	1	0.02	89	0.17
Video Creative Throttled	69	0.16	11	0.16	81	0.16
Native Ad Missing Elements	33	0.08	8	0.12	42	0.08
URL Not Yet Reviewed	33	0.07	2	0.03	35	0.07
Video Ad in Non-Video Slot	29	0.07	0	0.00	29	0.06
Other Google Filter	127	0.29	32	0.45	159	0.31
<b>Subtotal:</b>	<b>638</b>	<b>1.44 %</b>	<b>82</b>	<b>1.18 %</b>	<b>720</b>	<b>1.40 %</b>
<b><u>Publisher-Filtered</u></b>						
Sensitive Category	236	0.53 %	18	0.25 %	254	0.50 %
Product Category	206	0.46	11	0.15	217	0.42
Lost To PMP Deal	72	0.16	80	1.14	151	0.30
Excluded Advertiser	146	0.33	5	0.07	151	0.29
Excluded URL	125	0.28	5	0.07	129	0.25
Publisher Blocks Open Auctions	89	0.20	0	0.00	89	0.17
Publisher Rules	68	0.15	2	0.03	70	0.14
Publisher Blocked Buyer	53	0.12	0	0.00	53	0.10
Excluded Vendor Type	38	0.09	1	0.02	39	0.08
Publisher Manually Filtered	36	0.08	0	0.00	36	0.07
Other Publisher Filter	319	0.72	23	0.33	342	0.67
<b>Subtotal:</b>	<b>1,151</b>	<b>2.60 %</b>	<b>126</b>	<b>1.81 %</b>	<b>1,277</b>	<b>2.49 %</b>
<b><u>Miscellaneous-Filtered</u></b>						
Other Filters	183	0.65 %	8	0.67 %	190	0.65 %
<b>Filtered Bid Total:</b>	<b>1,971</b>	<b>4.45 %</b>	<b>216</b>	<b>3.10 %</b>	<b>2,187</b>	<b>4.26 %</b>
<b><u>All Outcomes</u></b>						
Filtered Bid	1,971	4.45 %	216	3.10 %	2,187	4.26 %
Bid Below Threshold	28,187	63.58	1,190	17.05	29,377	57.25
Outbid Above Threshold	11,974	27.01	4,337	62.15	16,311	31.79
Auction Won	2,196	4.95	1,235	17.69	3,431	6.69
<b>Grand Total:</b>	<b>44,335</b>	<b>100.00 %</b>	<b>6,979</b>	<b>100.00 %</b>	<b>51,314</b>	<b>100.00 %</b>

Notes: Miscellaneous-filtered outcomes are those where the filtering party is unclear or undefined (for example, technical errors.) Filtered bids in the “All Outcomes” subtable reflect the total of all filtered outcomes as summed above. Filters with low overall prevalence are combined into “other” categories. “Bids Below Threshold” and “Outbid Above Threshold” outcomes are defined by bid\_filter\_reason but are not considered bid filters.

Source: DOJ RFP 57 Corrected Bidder Behavior Data.

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**Figure 129**  
**Bidder Analysis for Top Bidders by Total Bids in Google Ad Manager Log-Level Data**  
**Part One of Two**

Ad Network or Exchange	Exchange Bidder	Total Bids	Total Payout for Winning Bids	Average of Winning Bid's Payout Minus Floor	Percentage of Bids Won	Percentage of Bids Lost	Percentage of Bids Under Floor	Percentage of Bids Blocked	Percentage of Bids Other
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
			------(USD)-----						
Google Ads	0	17,821,193,500	\$ 5,703,567.09	\$ 0.0001695	36.34 %	36.16 %	27.47 %	0.04 %	0.00 %
DV360	0	18,030,213,357	3,372,280.76	0.0001126	23.26 %	31.10 %	45.58 %	0.06 %	0.00 %
Reservation	0	89,498,914,897	79,937,472.73	-0.0010793	12.50 %	37.73 %	2.34 %	11.01 %	36.42 %
Criteo (US)	0	5,893,272,702	67,779.15	0.0000070	1.42 %	16.95 %	76.93 %	1.78 %	2.92 %
Criteo Europe	0	4,256,534,110	71,597.12	0.0000097	3.62 %	21.94 %	69.33 %	1.70 %	3.40 %
HBYG	0	3,408,099,486	764,510.80	0.0000375	10.89 %	16.25 %	72.85 %	- %	0.00 %
Index Exchange	1	2,521,731,097	253,619.86	0.0000716	9.36 %	84.33 %	3.14 %	1.28 %	1.90 %
Criteo (JP)	0	2,097,780,315	47,346.22	0.0000112	6.90 %	37.70 %	51.39 %	2.00 %	2.01 %
OpenX	1	1,720,046,692	151,071.22	0.0000571	11.20 %	84.87 %	2.85 %	0.45 %	0.62 %
PubMatic	1	1,710,669,203	269,507.16	0.0000951	13.82 %	82.30 %	2.75 %	0.58 %	0.55 %
Verizon Media DSP - Global	0	1,698,599,997	33,998.18	0.0000128	1.91 %	16.67 %	76.65 %	4.03 %	0.73 %
Rubicon	1	1,668,373,864	312,429.49	0.0001336	24.56 %	70.29 %	2.99 %	1.14 %	1.02 %
Conversant	0	887,709,882	2,305.76	0.0000018	0.37 %	77.05 %	0.61 %	17.22 %	4.75 %
Media.Net	1	871,342,790	132,174.09	0.0000978	13.65 %	82.03 %	3.78 %	0.33 %	0.22 %
Quantcast	0	844,563,837	16,831.59	0.0000142	3.67 %	89.50 %	2.35 %	3.56 %	0.91 %
Smadex	0	772,994,757	8,628.72	0.0000045	11.07 %	74.29 %	2.23 %	11.05 %	1.36 %
Criteo (UK)	0	761,308,625	8,311.75	0.0000064	2.25 %	21.71 %	71.75 %	2.37 %	1.92 %
Zemanta	0	752,468,049	19,544.11	0.0000173	9.96 %	54.88 %	1.16 %	29.78 %	4.21 %
The Trade Desk	0	724,321,729	111,718.98	0.0000622	13.29 %	70.07 %	5.48 %	5.66 %	5.51 %

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**Figure 129**  
**Bidder Analysis for Top Bidders by Total Bids in Google Ad Manager Log-Level Data**  
**Part Two of Two**

Ad Network or Exchange	Exchange Bidder	Total Bids	Total Payout for Winning Bids	Average of Winning Bid's Payout Minus Floor	Percentage of Bids Won	Percentage of Bids Lost	Percentage of Bids Under Floor	Percentage of Bids Blocked	Percentage of Bids Other
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
			------(USD)-----						
Criteo (SG)	0	705,847,459	\$ 5,724.75	\$ 0.0000043	9.07 %	26.31 %	62.71 %	0.88 %	1.02 %
TripleLift	1	622,805,307	81,691.40	0.0000932	12.96 %	79.44 %	2.06 %	1.47 %	4.07 %
Appier PC	0	600,944,235	5,520.67	0.0000046	9.41 %	83.12 %	2.50 %	4.78 %	0.20 %
Amazon.com	0	594,539,786	41,587.07	0.0000410	6.56 %	77.11 %	2.61 %	10.98 %	2.74 %
Criteo (TR)	0	581,975,772	3,170.93	0.0000023	16.04 %	49.28 %	32.56 %	0.85 %	1.27 %
Criteo (BR)	0	568,315,950	8,853.74	0.0000083	6.05 %	26.13 %	64.75 %	0.94 %	2.14 %
Equativ (Smart Adserver)	1	545,155,668	49,491.09	0.0000633	15.84 %	75.22 %	3.43 %	1.33 %	4.18 %
OneTag	1	535,589,093	66,496.25	0.0000998	11.62 %	82.98 %	3.72 %	0.80 %	0.89 %
RTB House	0	466,510,030	24,317.27	0.0000326	9.78 %	77.81 %	6.12 %	4.99 %	1.30 %
Criteo (IT)	0	458,829,572	8,137.48	0.0000098	5.04 %	24.12 %	66.48 %	2.54 %	1.82 %
Baidu MediaGo	0	433,196,855	21,315.90	0.0000298	14.95 %	77.33 %	1.83 %	5.01 %	0.87 %
Logicad (SMN)	0	415,809,553	8,030.70	0.0000154	5.77 %	90.76 %	1.57 %	1.40 %	0.50 %
Criteo (AU)	0	409,491,510	4,095.64	0.0000053	2.39 %	19.22 %	75.90 %	1.81 %	0.68 %
Toutiao (USD)	0	389,984,137	30,851.24	0.0000639	13.88 %	56.95 %	1.68 %	6.31 %	21.18 %
Sharethrough	1	383,146,961	63,416.97	0.0001274	10.54 %	72.36 %	15.26 %	0.46 %	1.37 %
NextRoll	0	346,390,669	11,886.15	0.0000243	9.65 %	72.41 %	2.25 %	12.31 %	3.38 %
Media.net DSP	0	309,373,934	28,922.22	0.0000521	9.04 %	70.10 %	4.56 %	15.55 %	0.75 %
Criteo (IN)	0	305,979,208	1,420.15	0.0000022	14.47 %	25.20 %	57.80 %	1.44 %	1.09 %
Other EB	1	900,056,391	121,377.71	0.0000944	13.16 %	82.34 %	2.54 %	0.60 %	1.36 %
Other Non-EB	0	3,876,888,385	215,832.51	0.0000369	9.07 %	64.57 %	12.53 %	8.76 %	5.08 %

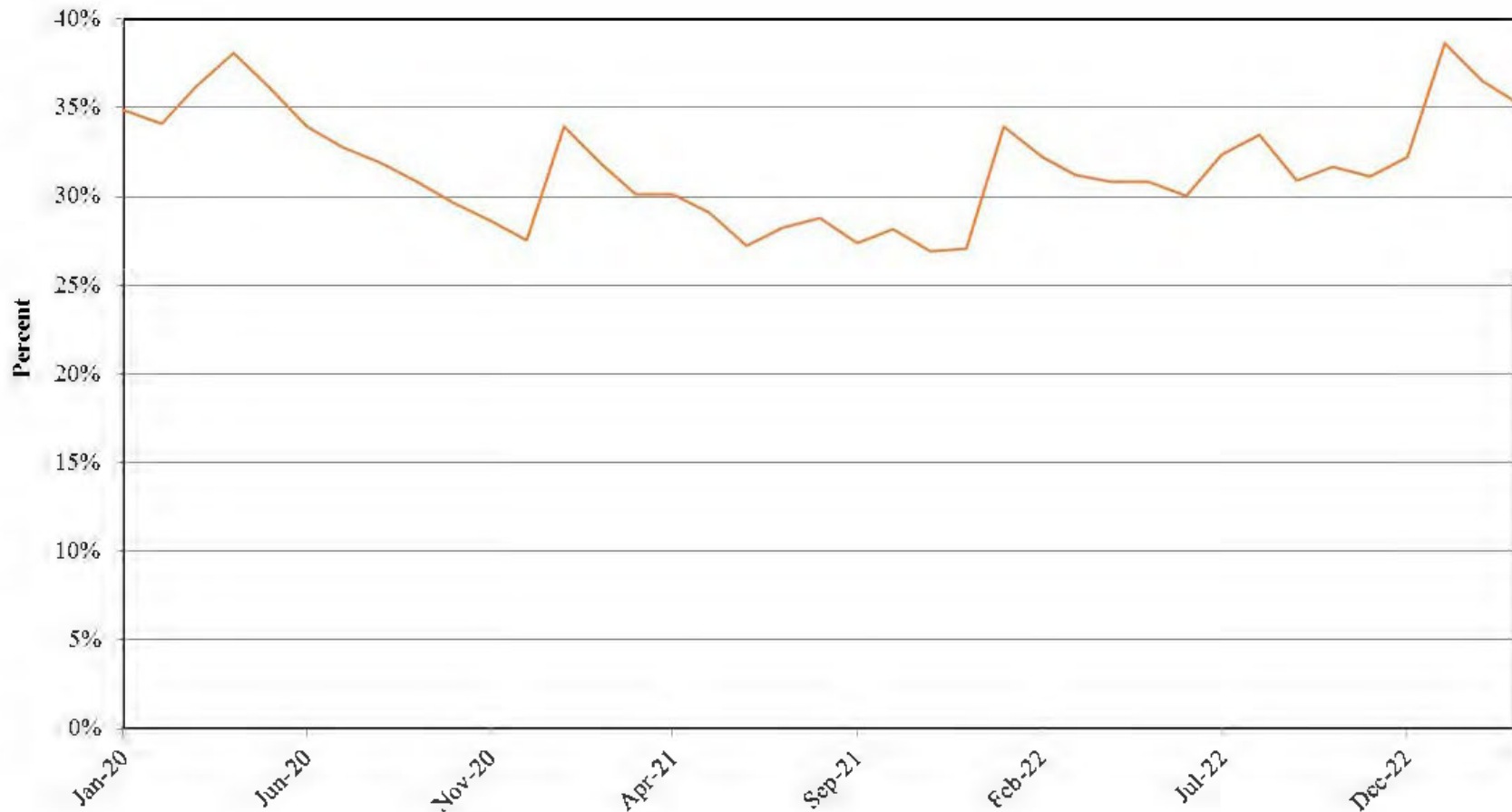
Notes: Data are limited to the 35th, 36th, 37th, 38th, and 39th seconds of every minute of June 1, 2023 through June 14, 2023. "Percentage of Bids Other" is the combined percentage of bids with the win\_loss field set to Policy, Throttled, No Ad, Outranked, or Other.

Source: DOJ RFP 50/59 GAM Bid Level Data.



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**Figure 130**  
**Average Rate of House Ads and Unfilled Impressions**  
**for U.S. DFP Publishers Using AdX**  
**January 2020 - March 2023**

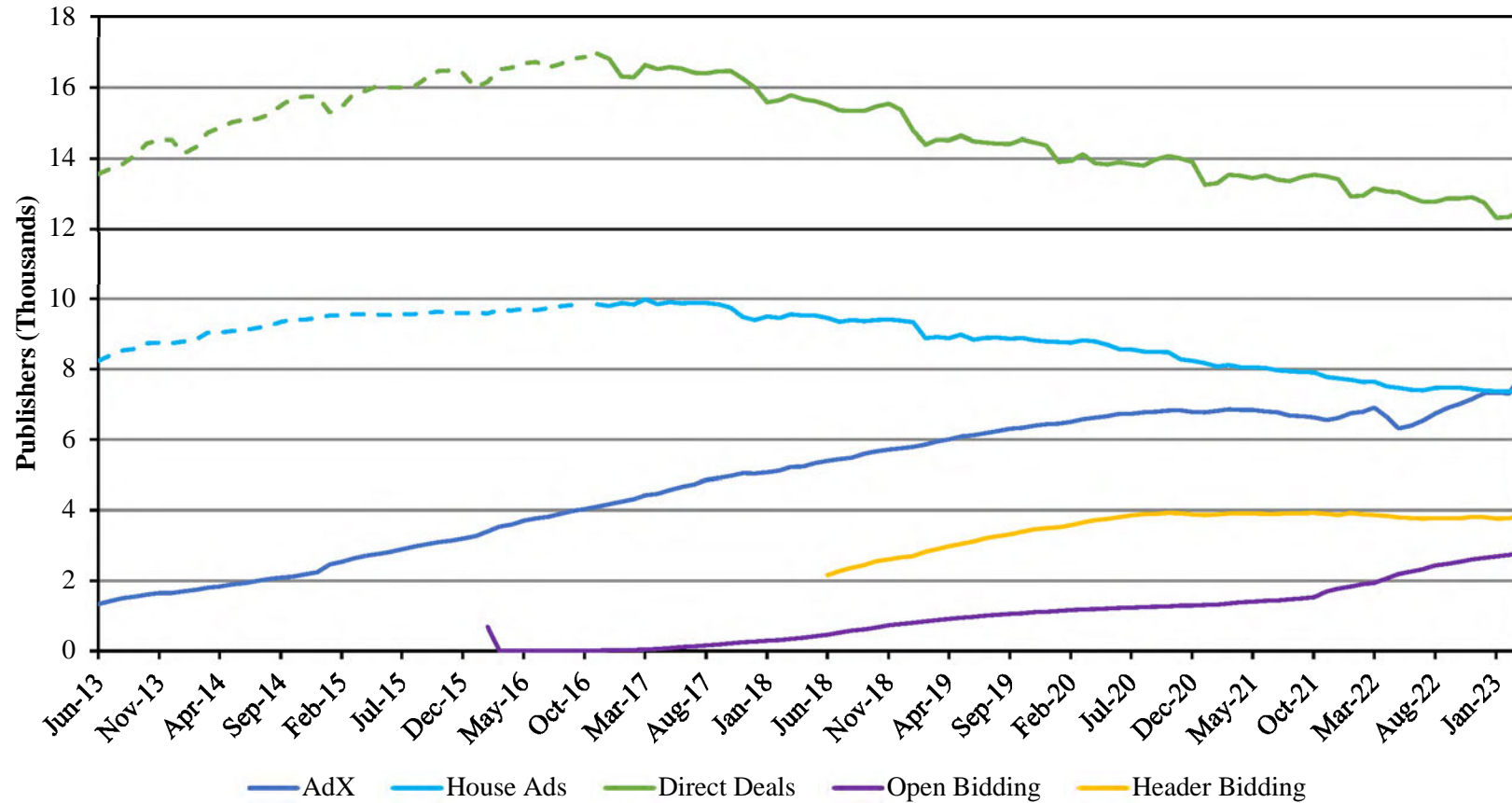


Notes: The average house ad and unfilled impression rate was calculated as the count of house ad and unfilled impressions divided by the count of billed impressions. AdX Publishers are identified in DFP data using network\_id.

Source: DOJ RFP 57 DFP Fees Data; MDL RFP 243 AdX Data.

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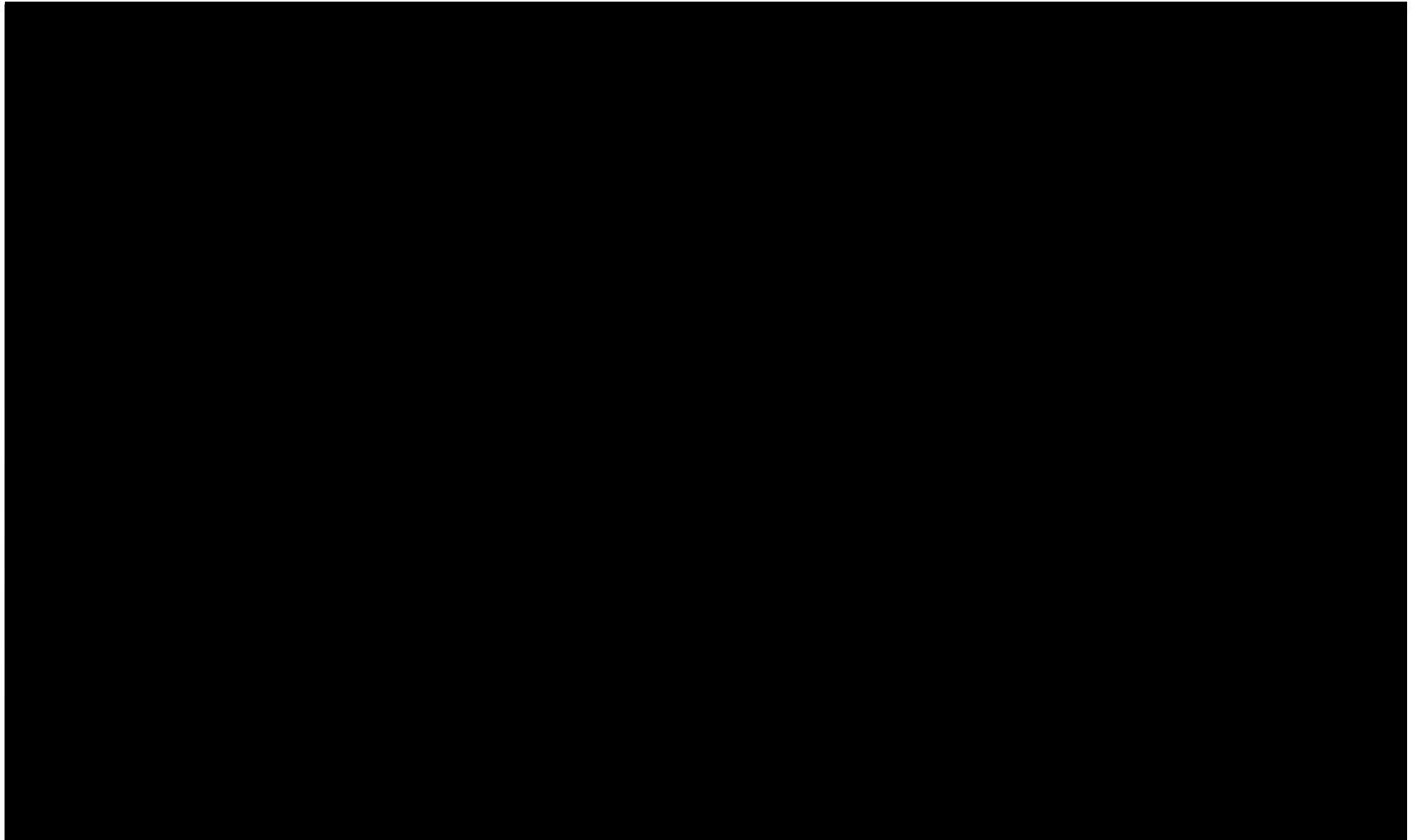
**Figure 131**  
**Count of Publishers Using DFP to Transact Display Ads Viewed by U.S. Users by Exchange Source**  
**June 2013 - March 2023**



Notes: The dotted line indicates limited availability of precise mobile app indicators in the DFP Reservations data. Header bidding data are not available in DFP Reservations data prior to June 2018. "House Ads" includes only impressions outside Header Bidding.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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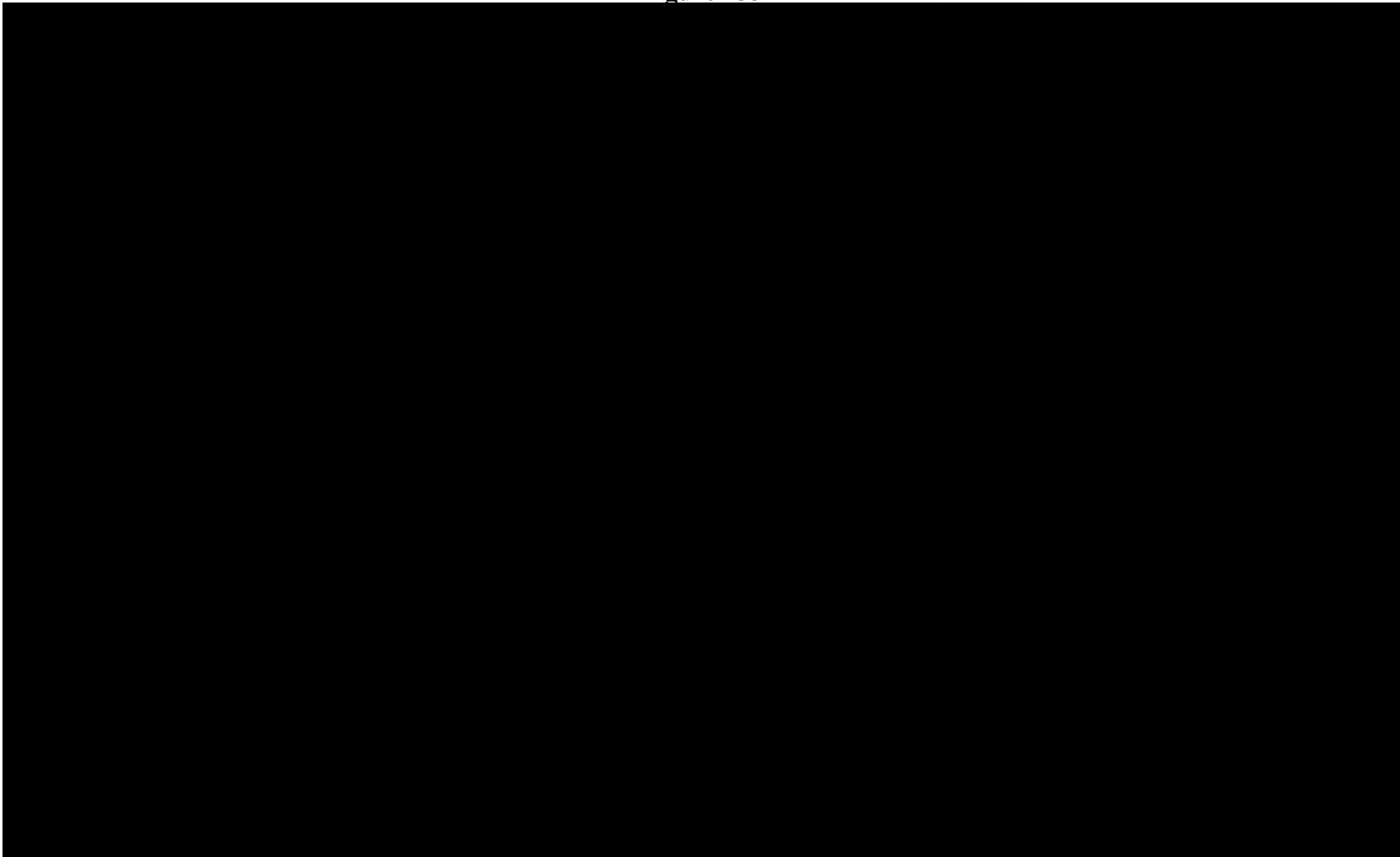


Notes: Total impressions represent the sum of DFP, AdX, and AdSense Backfill impressions. The dotted lines indicate limited availability of precise ad format indicators in the AdSense backfill data.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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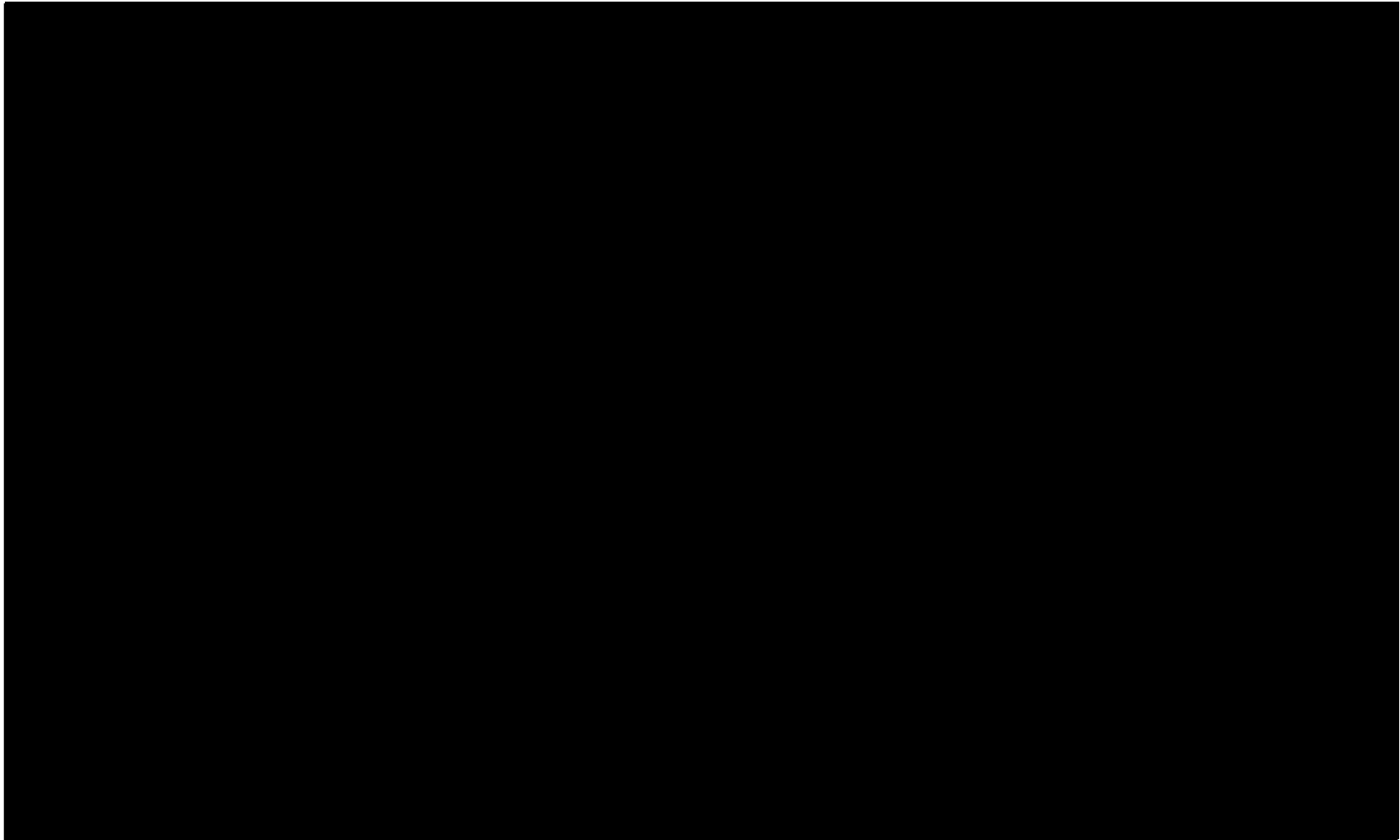
**Figure 133**



Notes: AdX and open bidding impressions are limited to those associated with publishers who use DFP. “DFP - Other” encompasses impressions in DFP that are not house ads, direct deals, or header bidding transactions. Because header bidding data are not available in DFP Reservations data prior to June 2018, “DFP - Other” is only defined after June 2018.

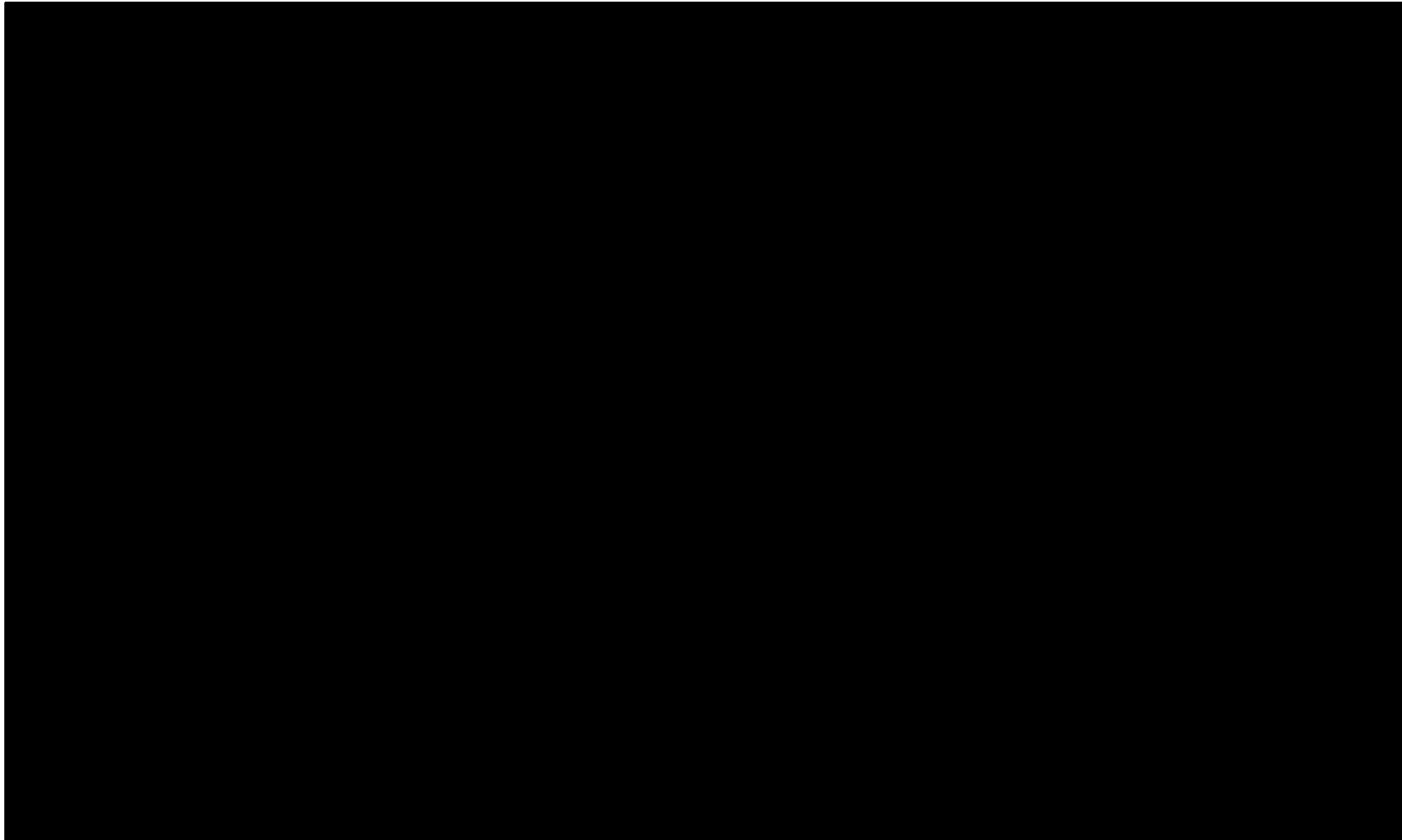
Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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Notes: Header bidding data are not available in DFP Reservations data prior to June 2018. Impressions transacted through Header Bidding do not exclude any reservation type.  
Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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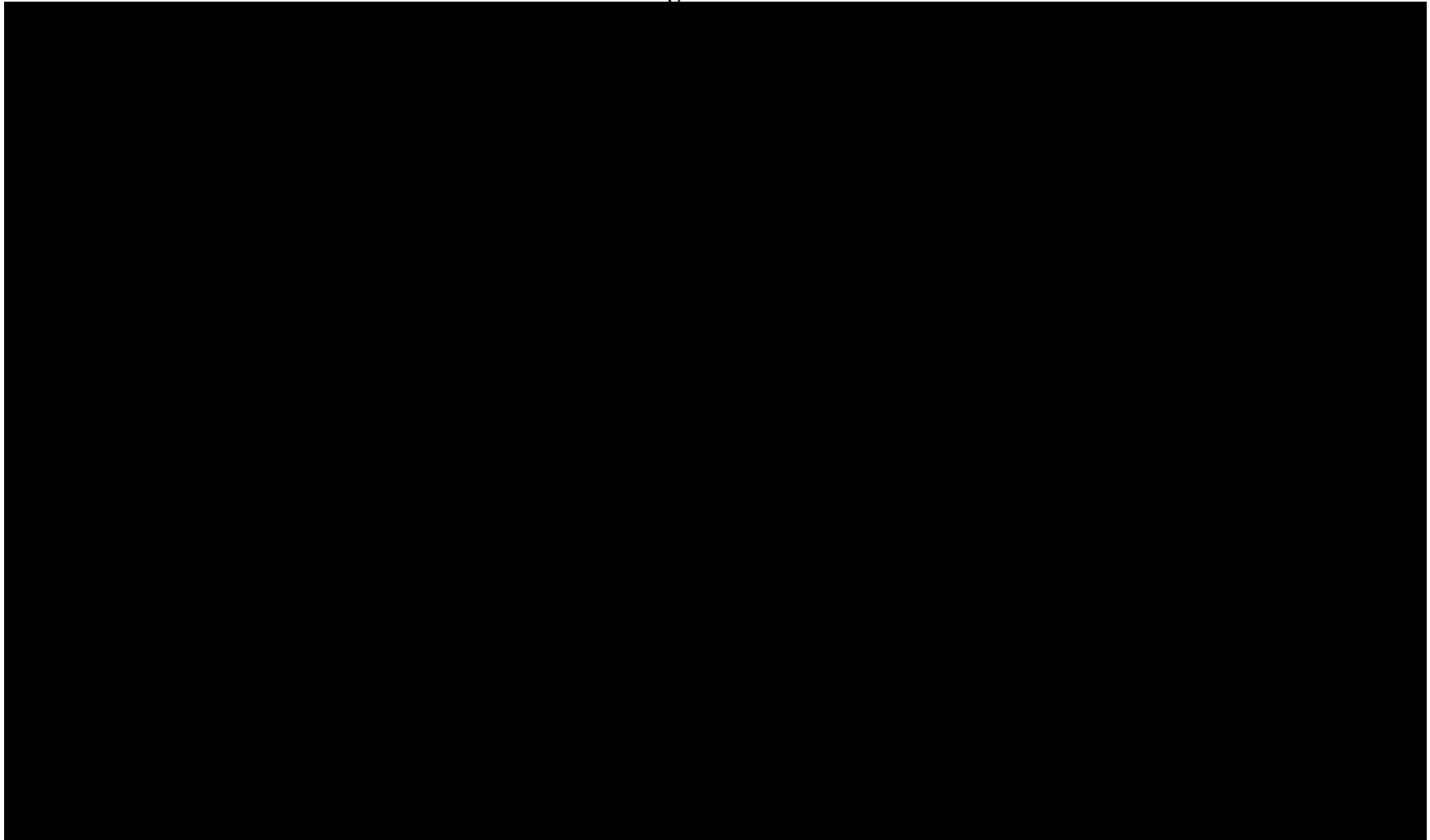


Notes: The dotted line indicates limited availability of precise mobile app indicators in the DFP Reservations data.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 136**

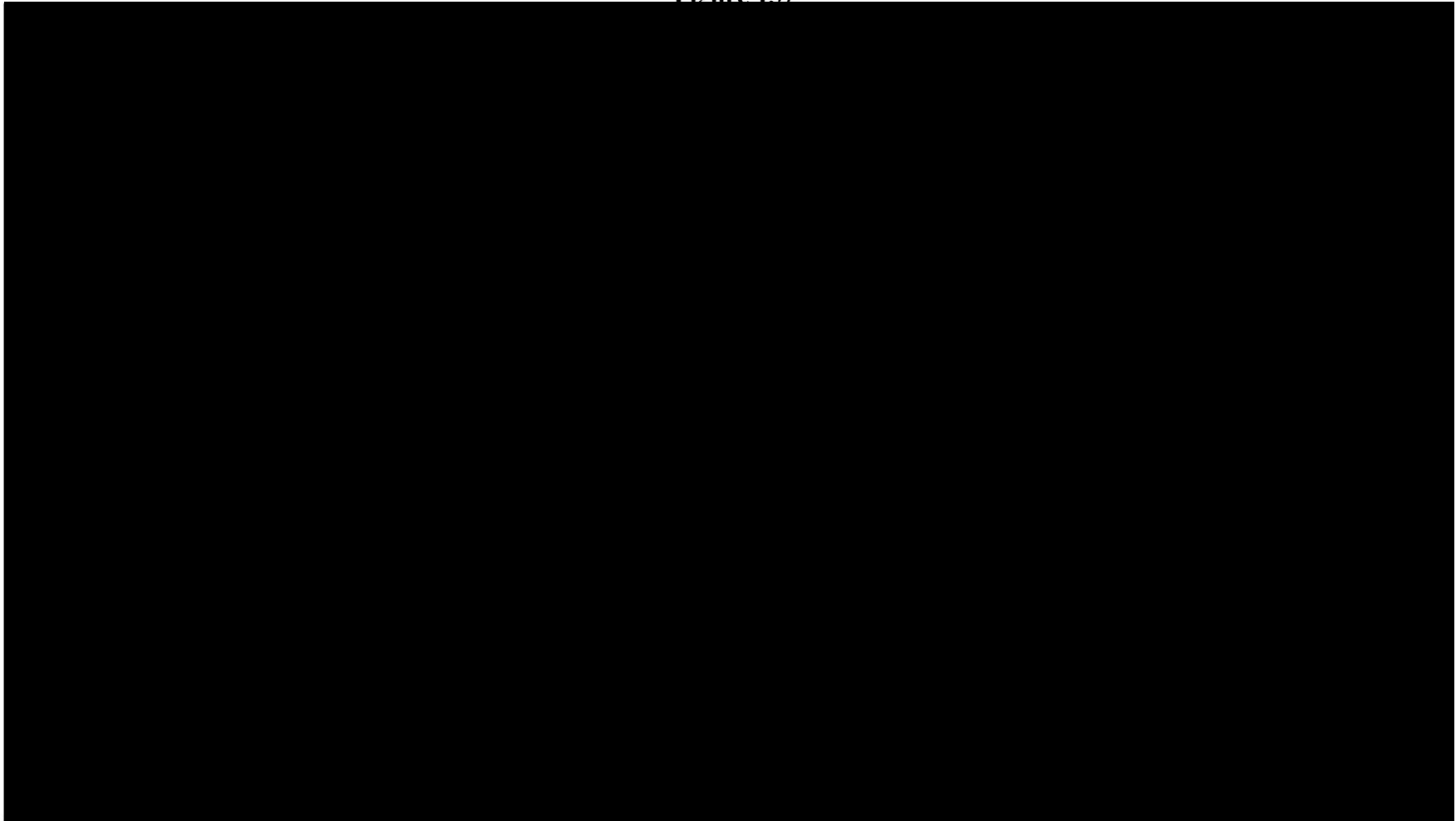


Notes: Total impressions represent the sum of DFP, AdX, and AdSense Backfill impressions.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 137**



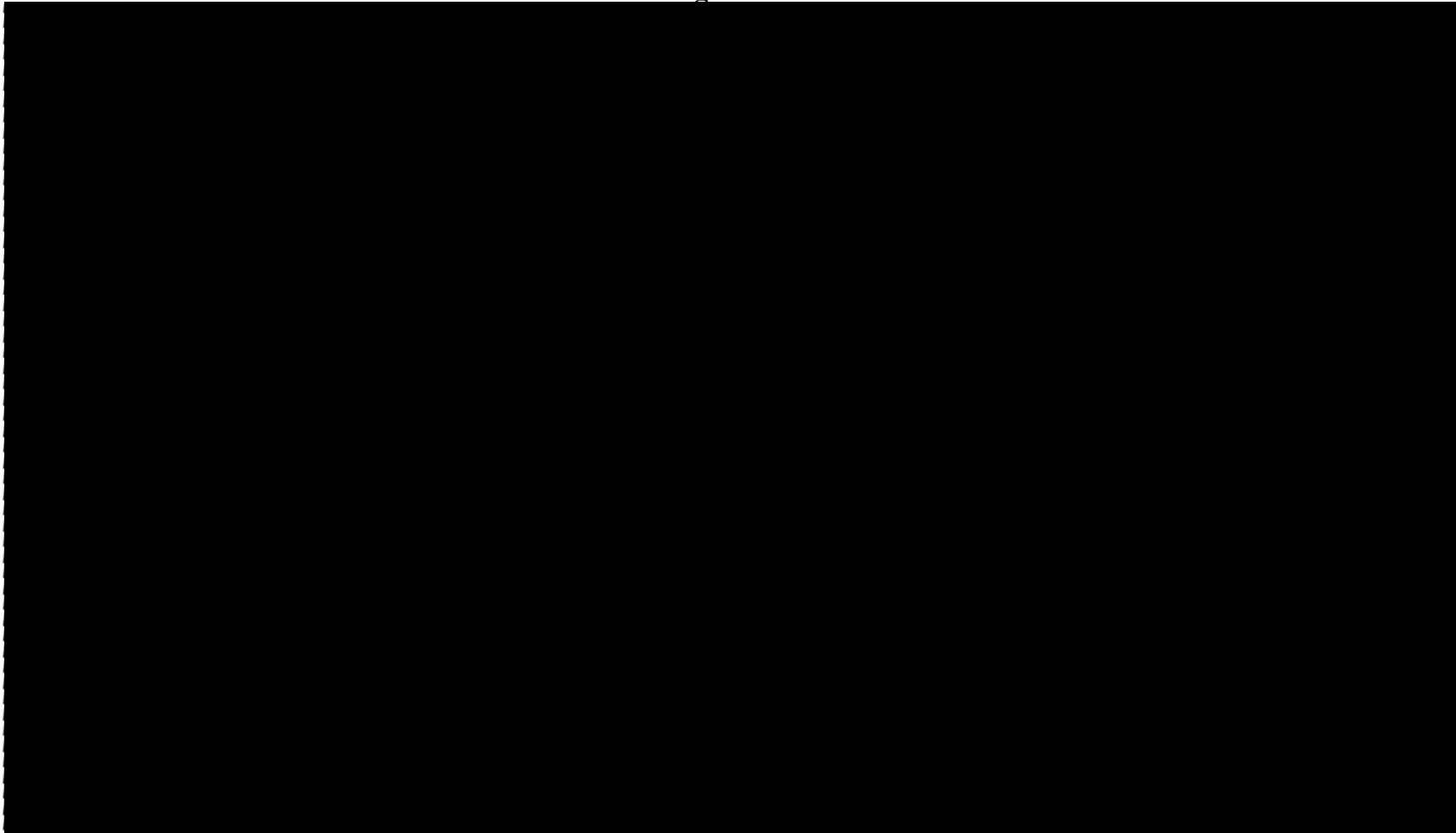
Notes: Third-party exchanges are identified using the inventory\_source field, i.e. where this field is equal to “3PE.”

Source: MDL RFP 243 Google Ads Data.



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**Figure 138**

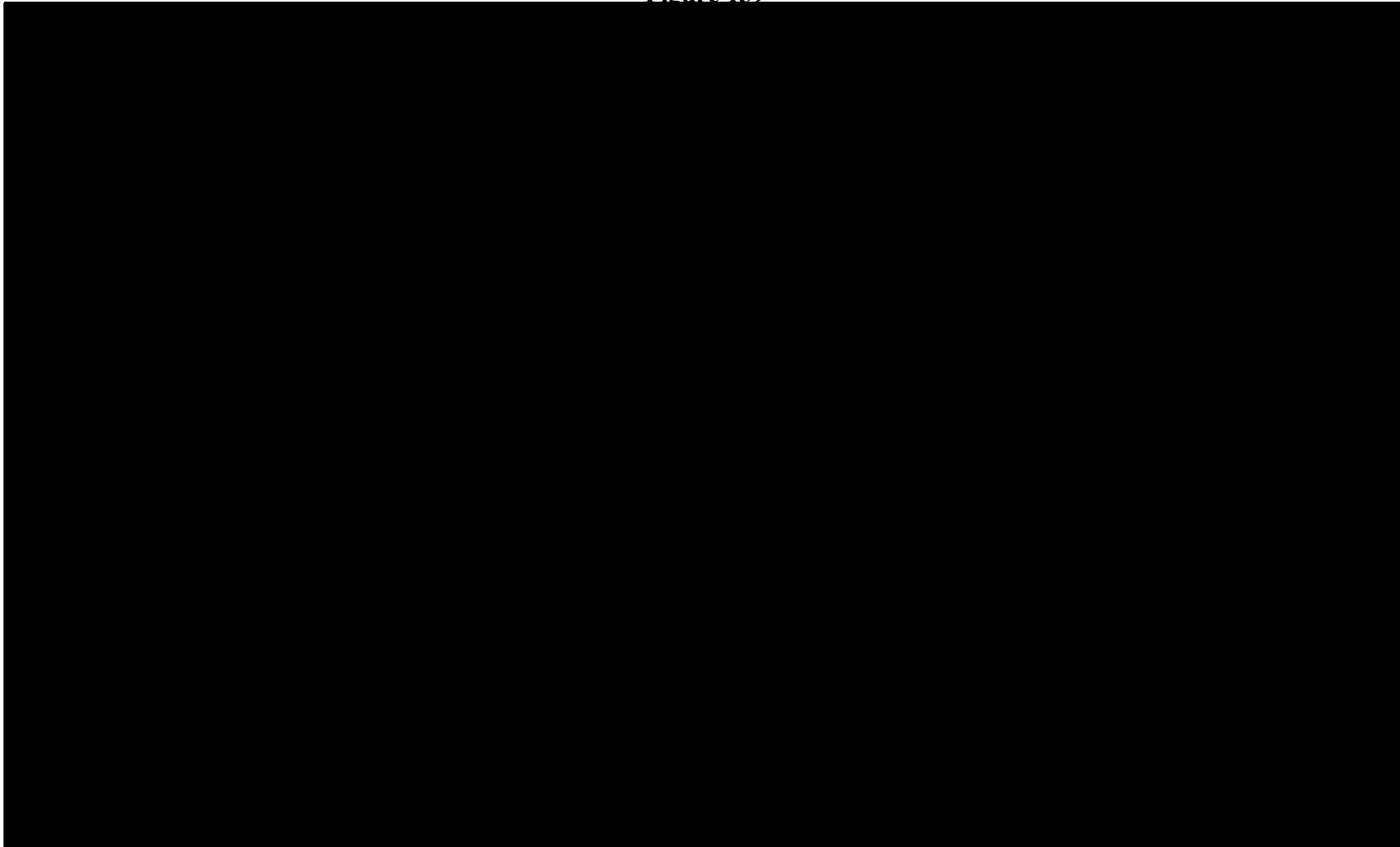


Notes: Publishers present in DFP Reservations that could be matched to AdX in at least one month during the time period were classified as DFP publishers using AdX and all others are classified as not using AdX.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

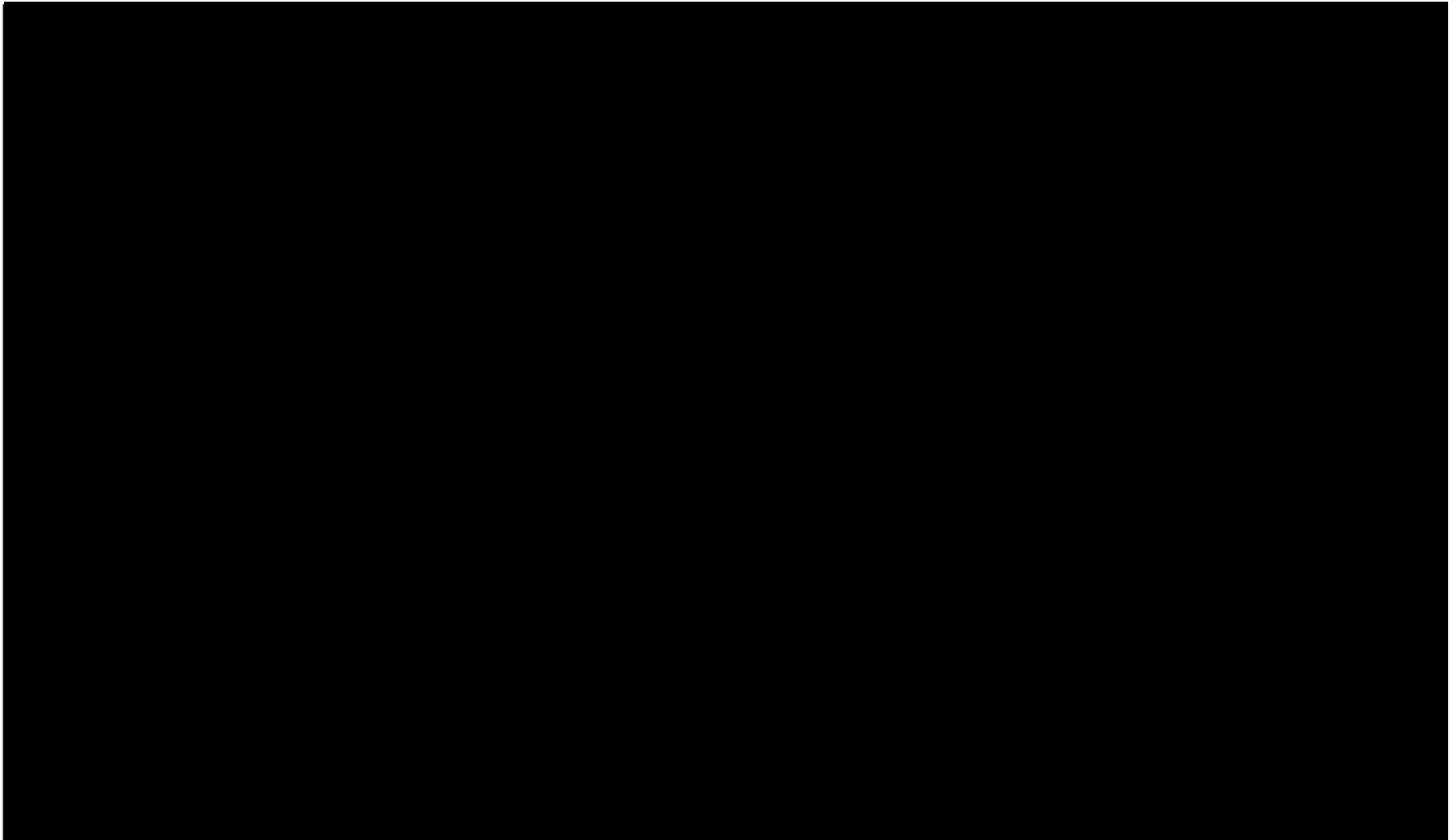
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**Figure 139**



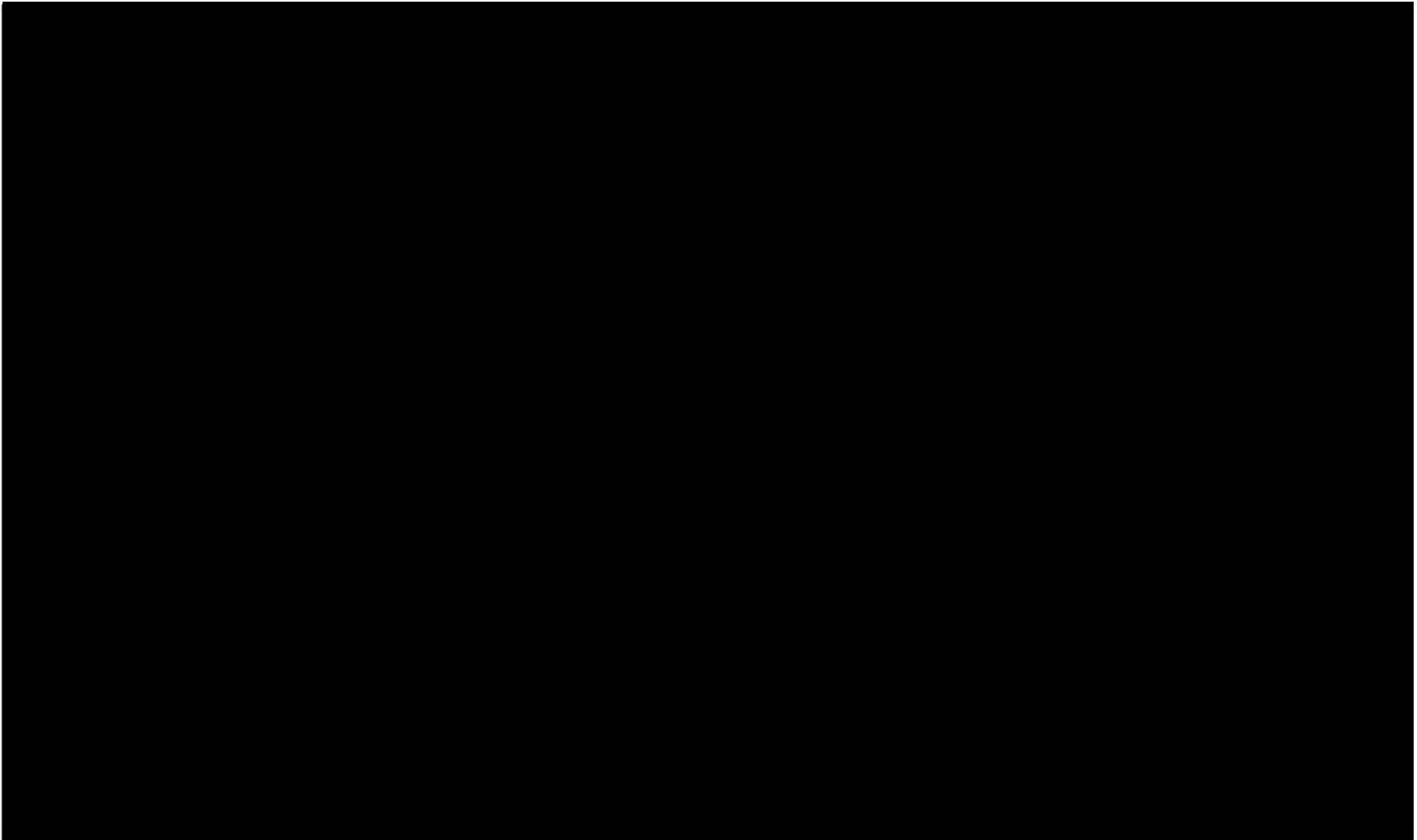
Source: MDL RFP 243 AdX Data.

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Source: MDL RFP 243 AdX Data.

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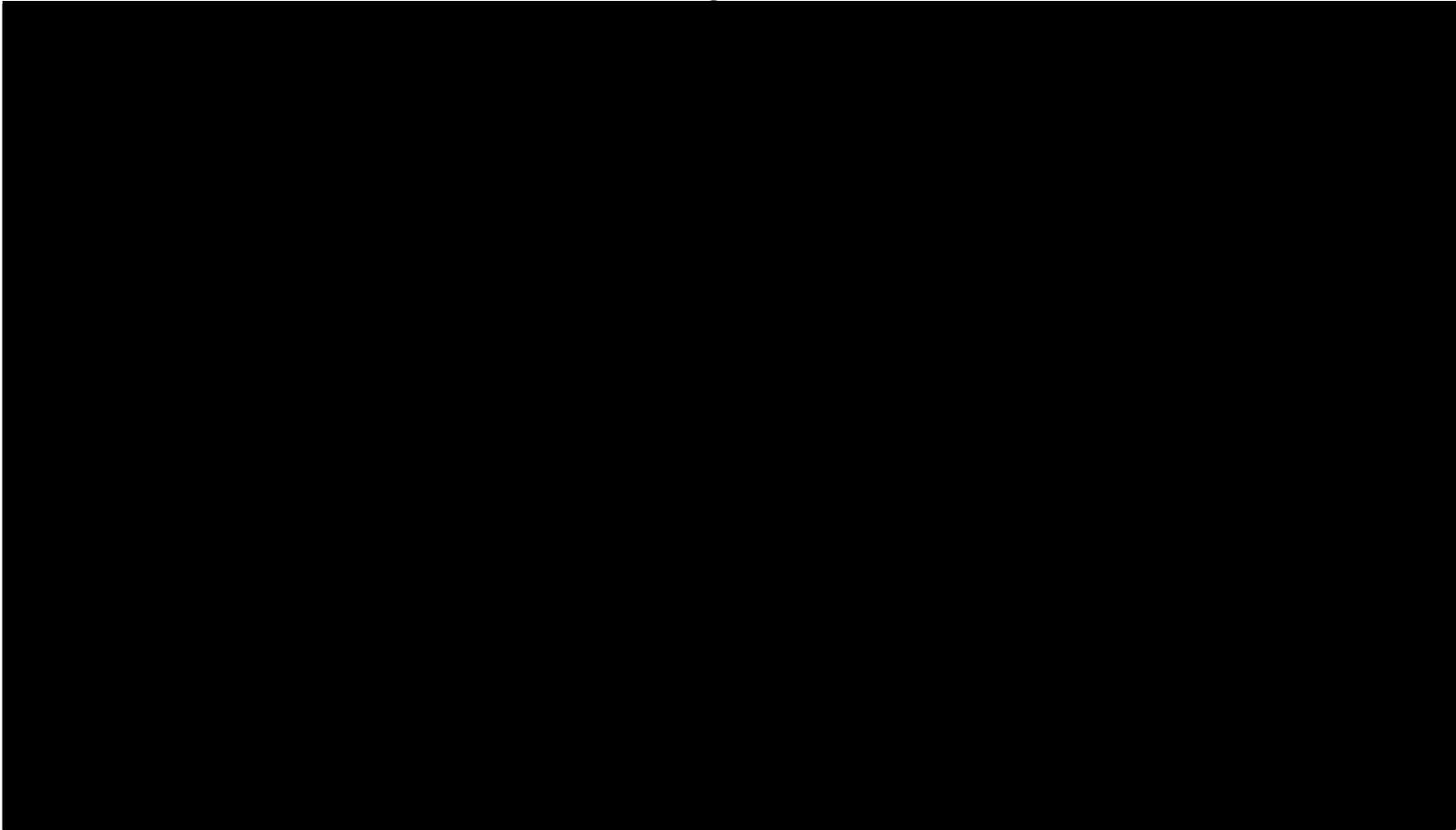


Notes: Publishers present in DFP Reservations that could be matched to AdX are classified as “DFP publishers using AdX.” The dotted shading indicates limited availability of precise ad format indicators in the AdSense backfill data.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 142**

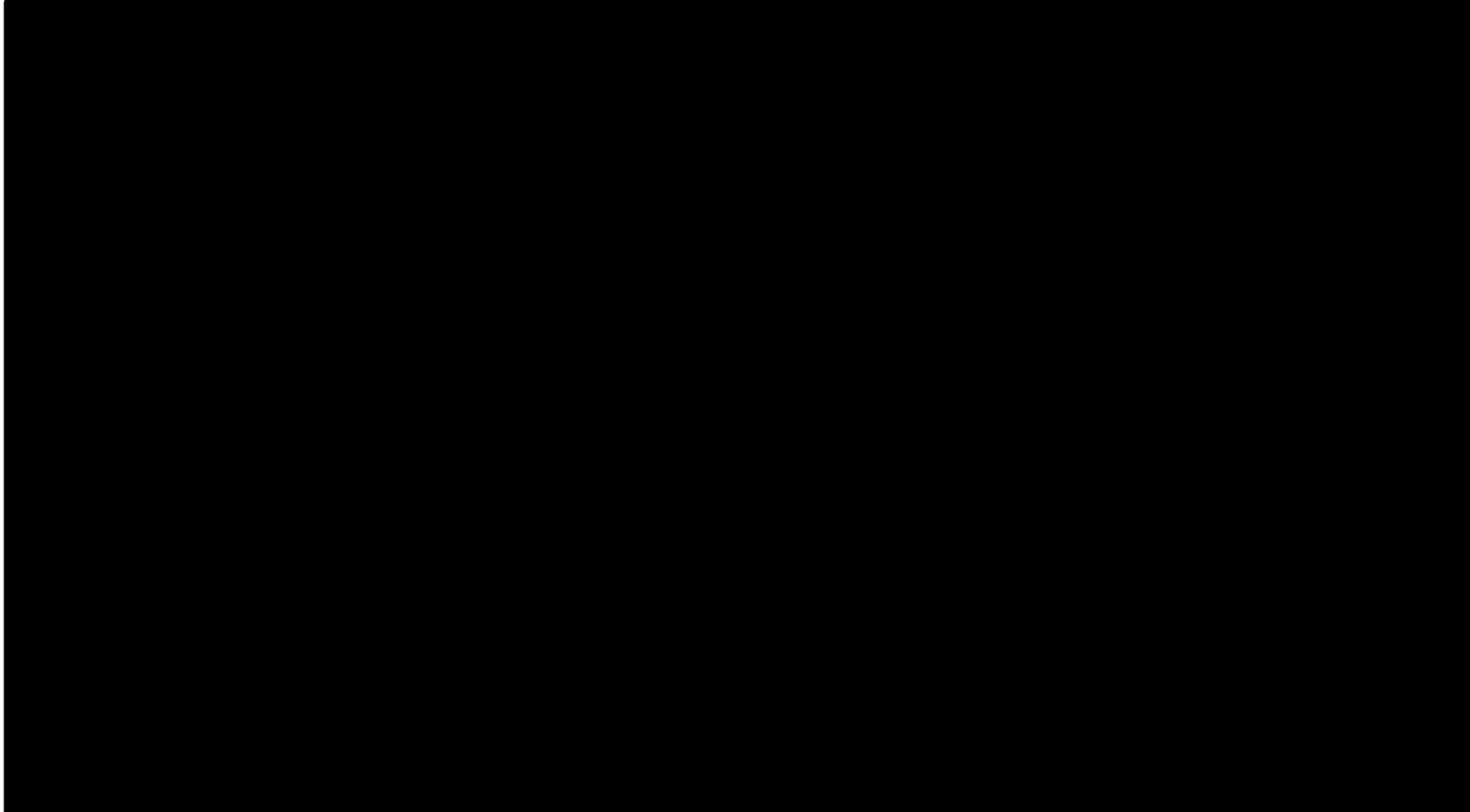


Notes: Data are limited to publishers present in both AdX and DFP data for a given month. "DFP - Other" encompasses impressions in DFP that are not house ads, direct deals, or header bidding transactions.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 143**

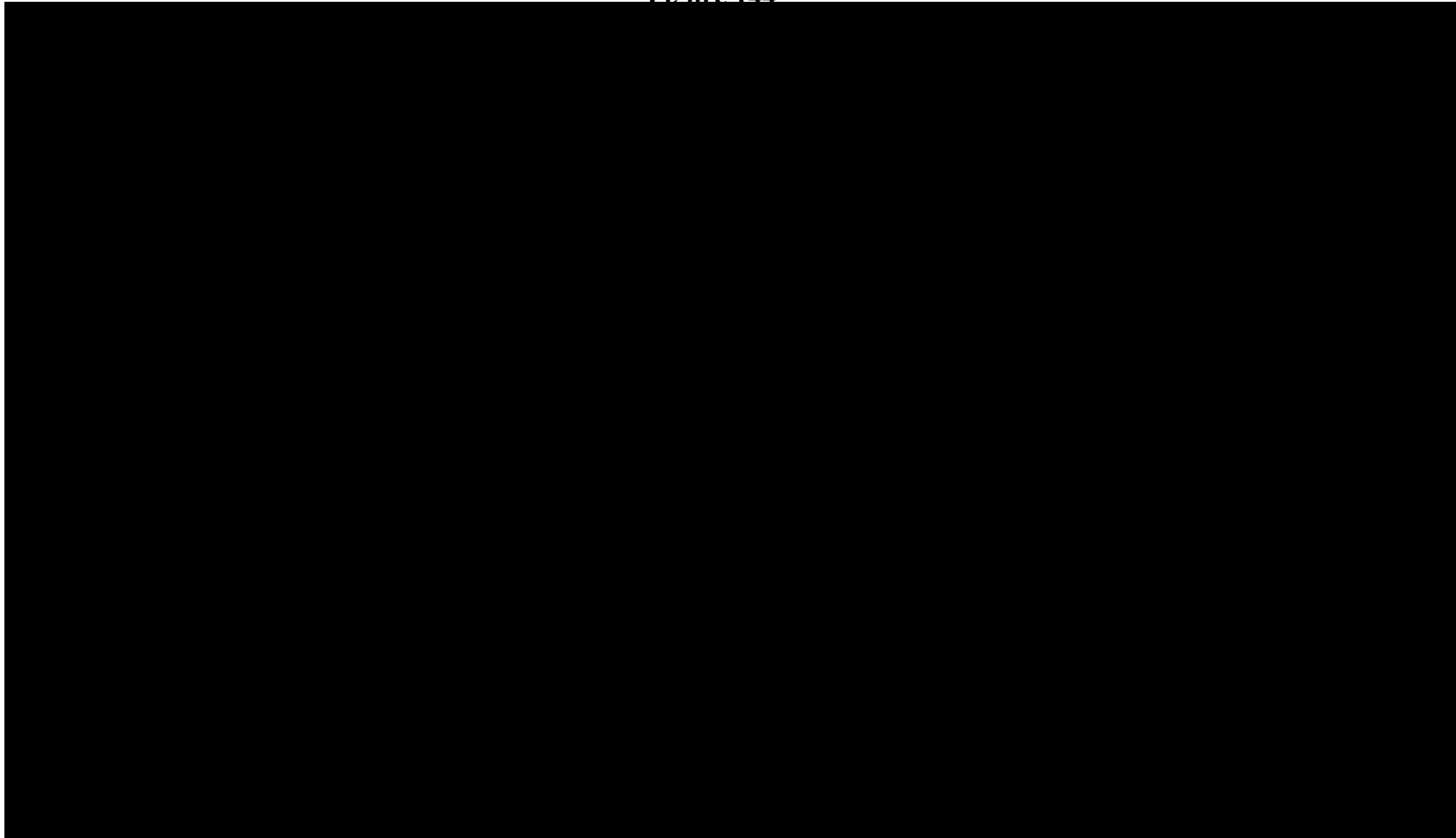


Notes: Publishers present in DFP Reservations are grouped by whether they could be matched to AdX in at least one month before or after the contract policy change in June 2016. Publishers who appear in the AdX data but not the DFP data before the policy change and who appear in both after are classified as “AdX Only Before Contract Policy Change, AdX and DFP After.” Publishers who appear in neither the AdX data nor the DFP data before the policy change but who appear in both after are classified as “AdX and DFP After Policy Change.” All other publishers are classified as “Unaffected by Contract Policy Change.”

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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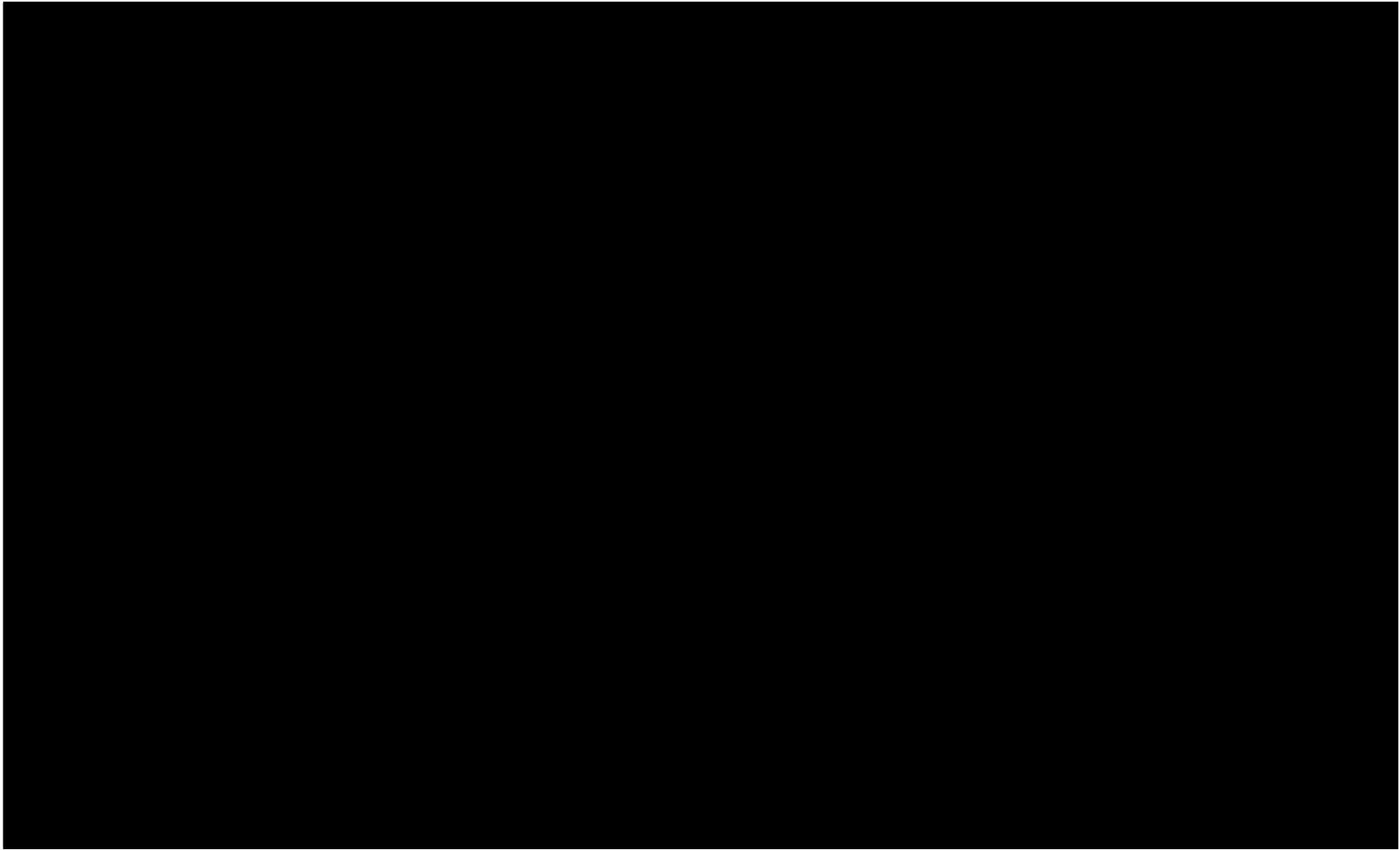
**Figure 144**



Notes: AdX and DFP publishers potentially impacted from the Contract policy change include all AdX or DFP publishers that started using both AdX and DFP after the Contract policy change. This includes the groups “AdX Only Before Contract Change, AdX and DFP After” and “AdX and DFP After RTB Change.” “House Ads” includes only impressions outside Header Bidding. “DFP - Other” encompasses impressions in DFP that are not house ads, direct deals, or header bidding transactions.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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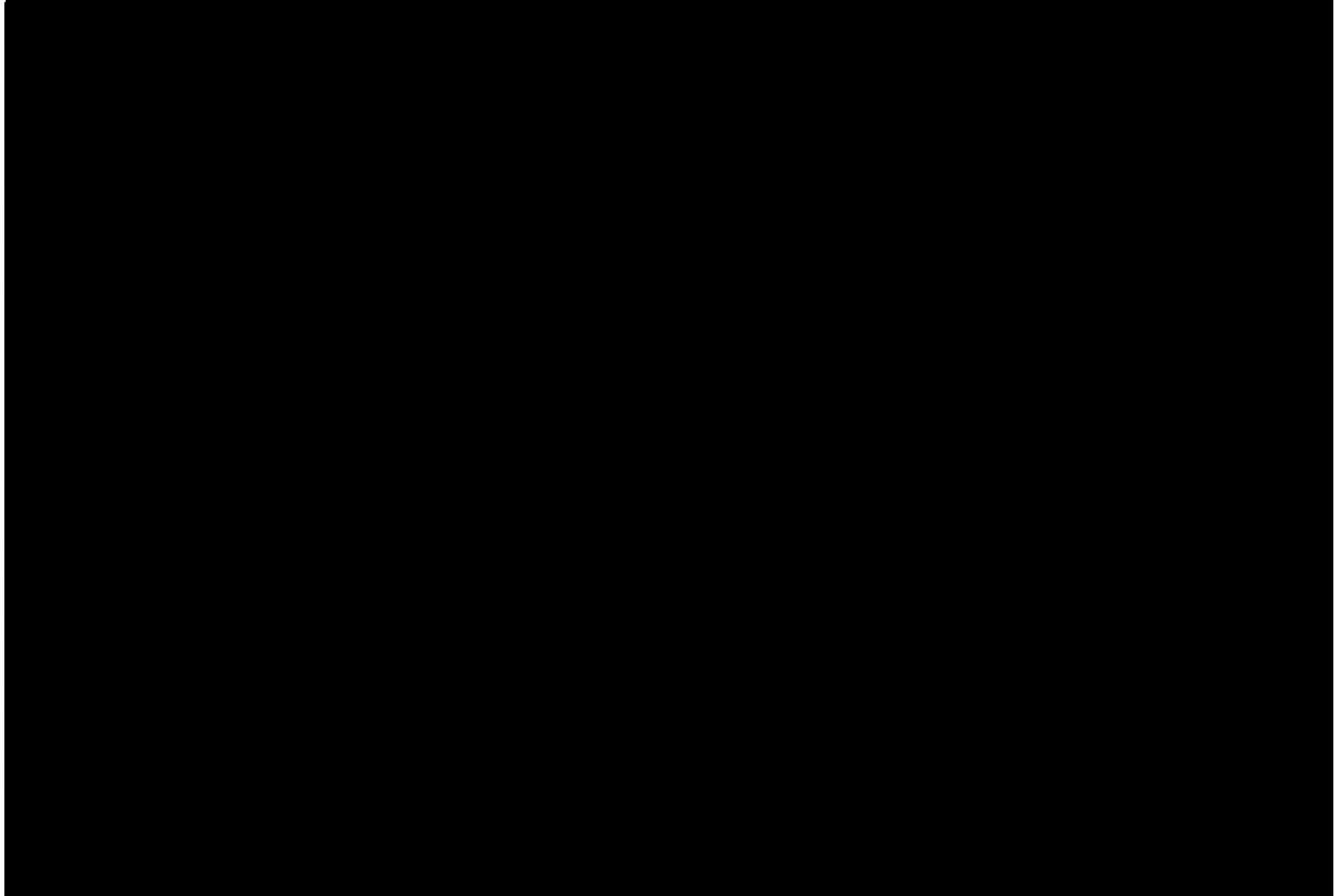
Notes: Publisher revenue per thousand impressions is calculated by multiplying publisher revenue by 1,000 and dividing by total impressions.

Source: MDL RFP 243 AdX Data.



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**Figure 146**

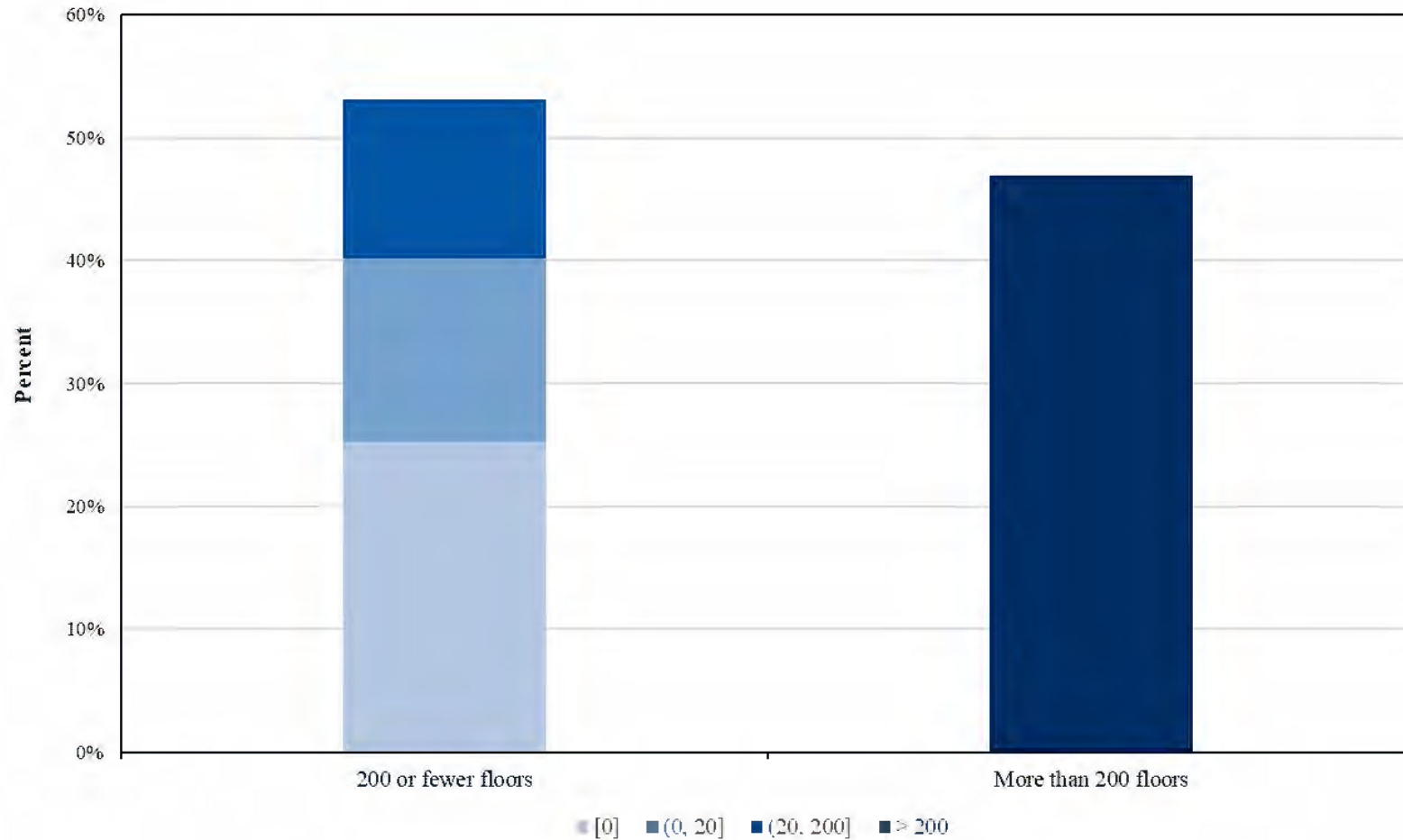


Notes: Publishers are assigned to groups if any transaction volume occurred across the named platform(s) within the given month.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 147**  
**Distribution of U.S. Publishers by Number of Distinct Floors Used in Google Ad Manager Log-Level Data**

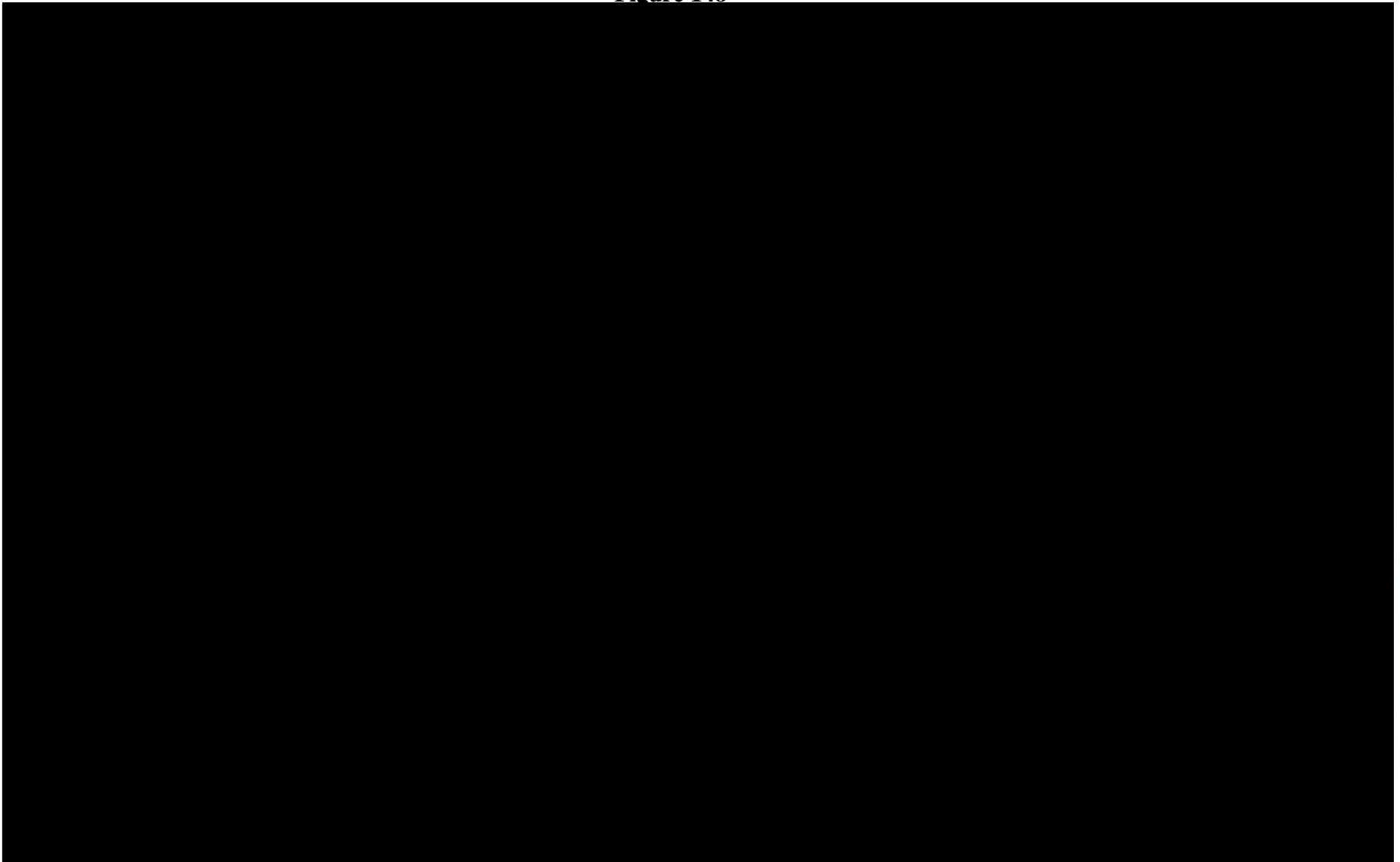


Notes: Data are limited to the 35th, 36th, 37th, 38th, and 39th seconds of every minute during June 1, 2023 through June 14, 2023. Floors are defined as distinct positive values of bid\_floor\_usd observed for each publisher.

Source: DOJ RFP 50/59 GAM Bid Level Data.

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**Figure 148**

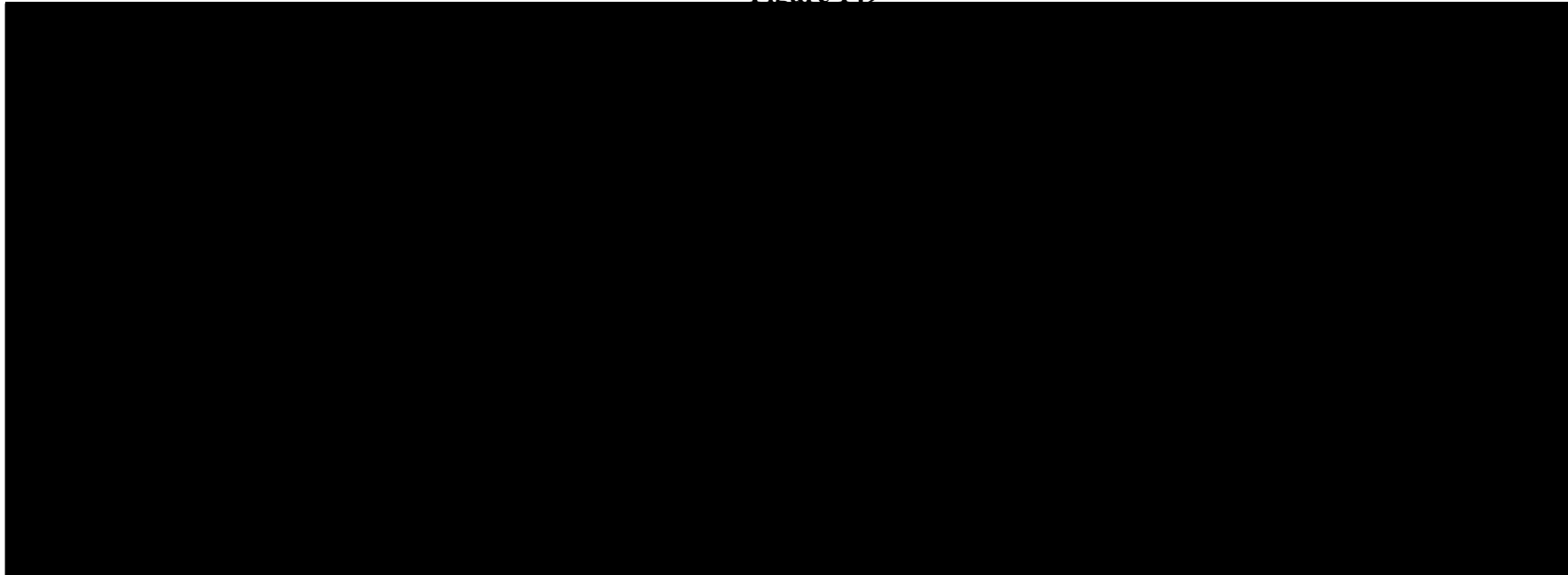


Notes: The Washington Post is identified where gfp\_network\_name equals "The Washington Post."

Source: MDL RFP 243 AdX Data.

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**Figure 149**

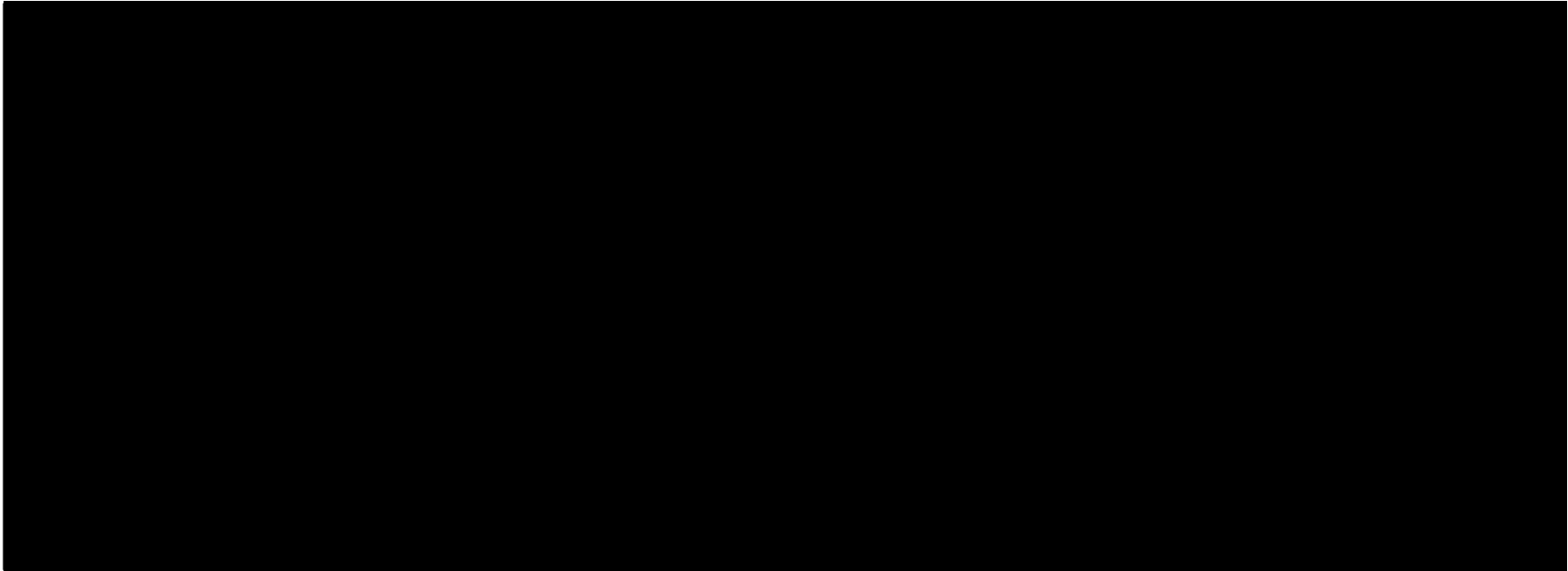


Notes: MDL RFP 243 AdX Data are used for this analysis. The field web\_property\_name is set to "Daily Mail US - AdX". The field is\_mobile\_app\_request is set to False. The field transaction\_type\_name is set to "OA - Open Auction." Publisher Revenue is measured as pub\_net\_rev\_usd The first vertical dashed line on the left represents the start of UPR rollout, the second vertical dashed line represents the 100 percent UPR rollout. *See* Gans Report, at fn. 674.

Source: Gans Report, at Figure 19 and associated backup materials.

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**Figure 150**

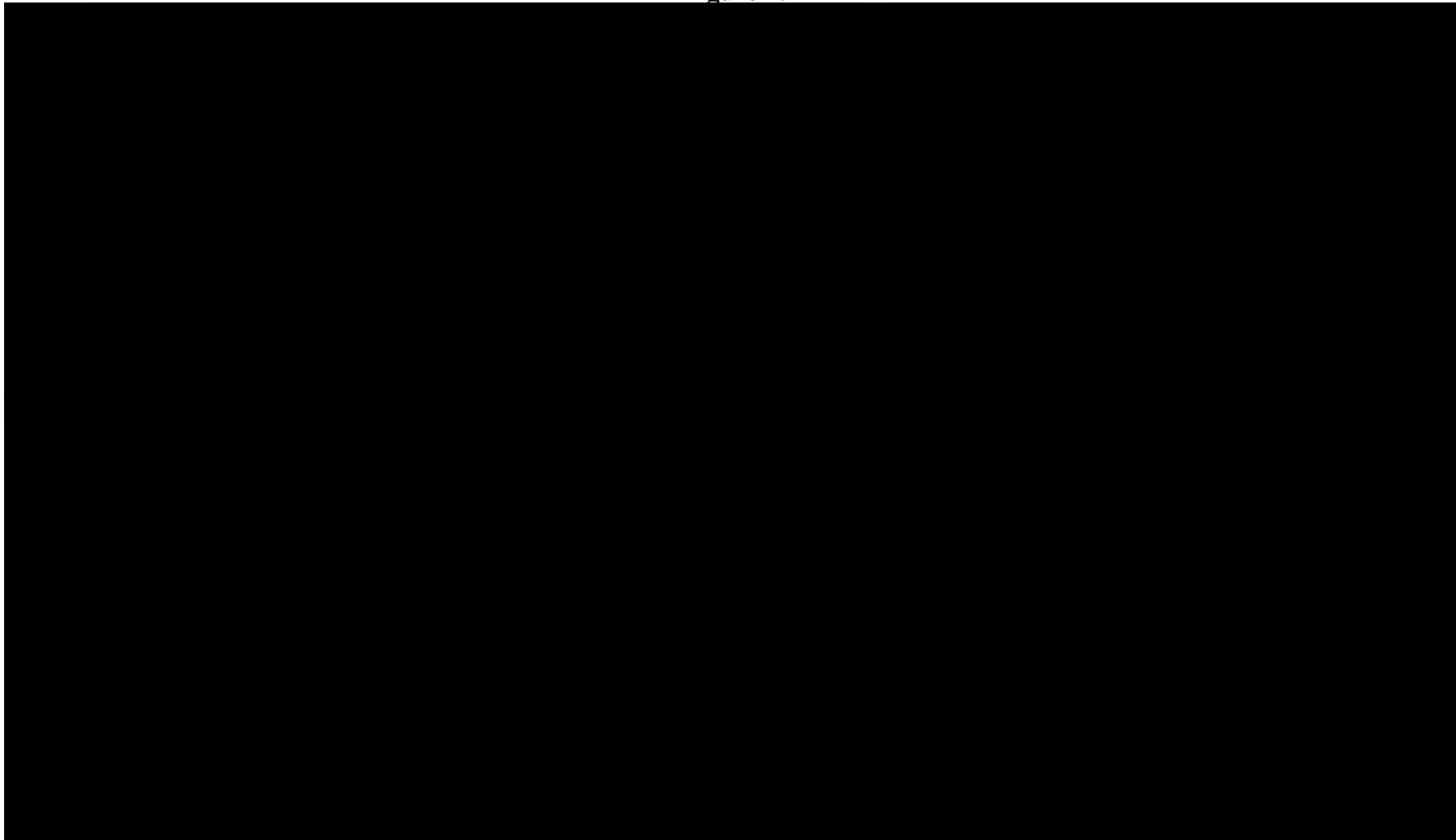


Notes: MDL RFP 243 AdX Data are used for this analysis. The field web\_property\_name is set to "Daily Mail US - AdX" The field is\_mobile\_app\_request is set to False. The field transaction\_type\_name is set to "OB - Open Bidding." Publisher Revenue is measured as pub\_net\_rev\_usd. The first vertical dashed line on the left represents the start of UPR rollout, the second vertical dashed line represents the 100 percent UPR rollout. *See* Gans Report, at fn. 674.

Source: Gans Report, at Figure 20 and associated backup materials.

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**Figure 151**

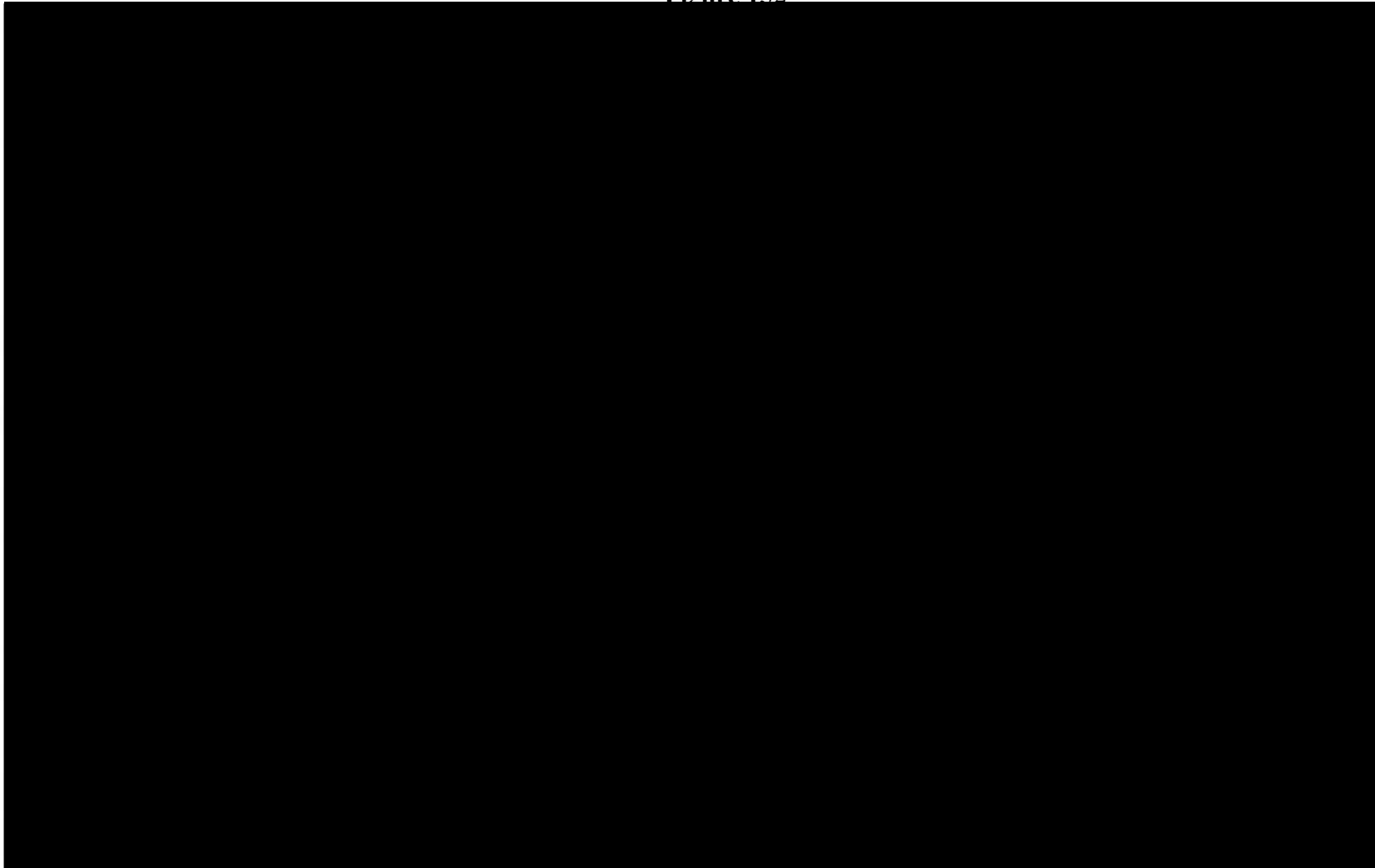


Notes: MDL RFP 243 AdX Data are used for this analysis. The field web\_property\_name is set to "Scripps Networks Interactive, Inc." The field is\_mobile\_app\_request is set to False. The field transaction\_type\_name is set to "OA - Open Auction." CPM is calculated as: once aggregated by month and transaction type, CPM is the ratio of the pub\_net\_rev\_usd and matched\_impressions. The ratio is then multiplied by 1,000. The first vertical dashed line on the left represents the start of UPR rollout, the second vertical dashed line represents the 100 percent UPR rollout. *See* Gans Report, at fn. 673.

Source: Gans Report, at Figure 19 and associated backup materials.

HIGHLY CONFIDENTIAL - SUBJECT TO PROTECTIVE ORDER

**Figure 152**

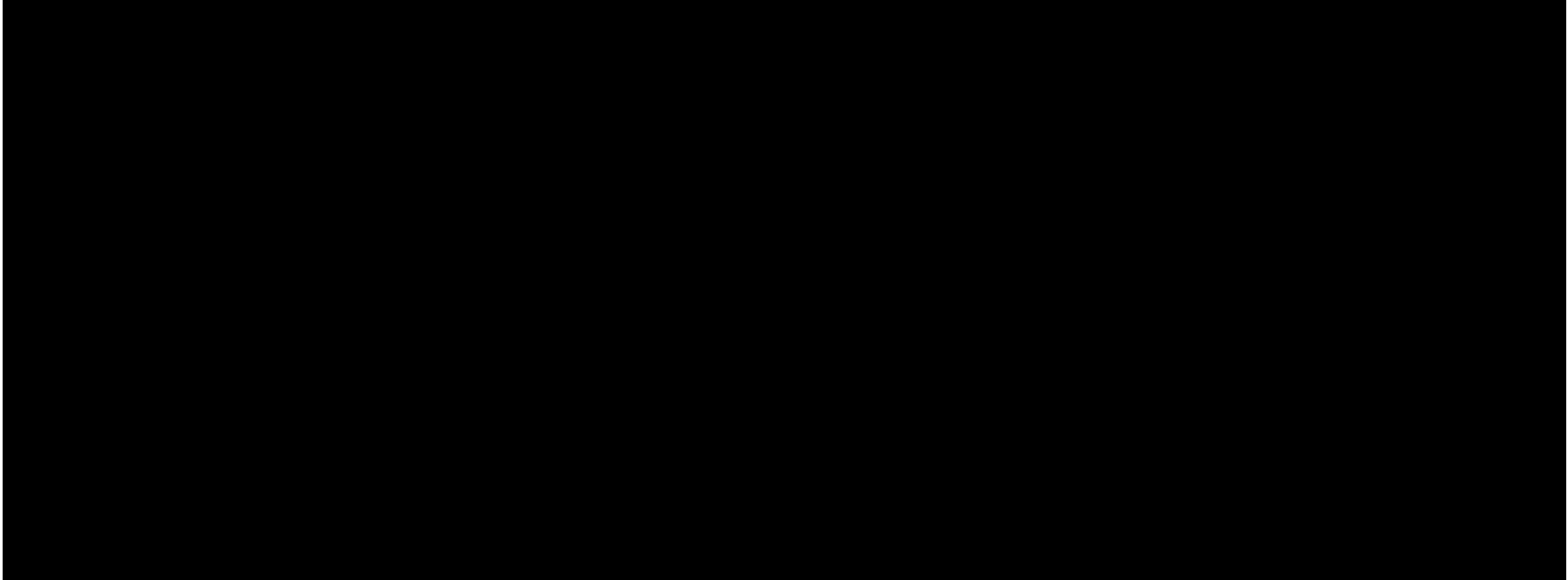


Notes: *See* Gans Report, at fn. 673.

Source: Gans Report, at Figure 19 and associated backup materials.

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**Figure 153**



Notes: MDL RFP 243 AdX Data are used for this analysis. The field web\_property\_name is set to "Scripps Networks Interactive, Inc." The field is\_mobile\_app\_request is set to False. The field transaction\_type\_name is set to "OA - Open Auction." Impressions are measured as matched\_impressions. The first vertical dashed line on the left represents the start of UPR rollout, the second vertical dashed line represents the 100 percent UPR rollout. *See* Gans Report, at fn. 674.

Source: Gans Report, at Figure 19 and associated backup materials.



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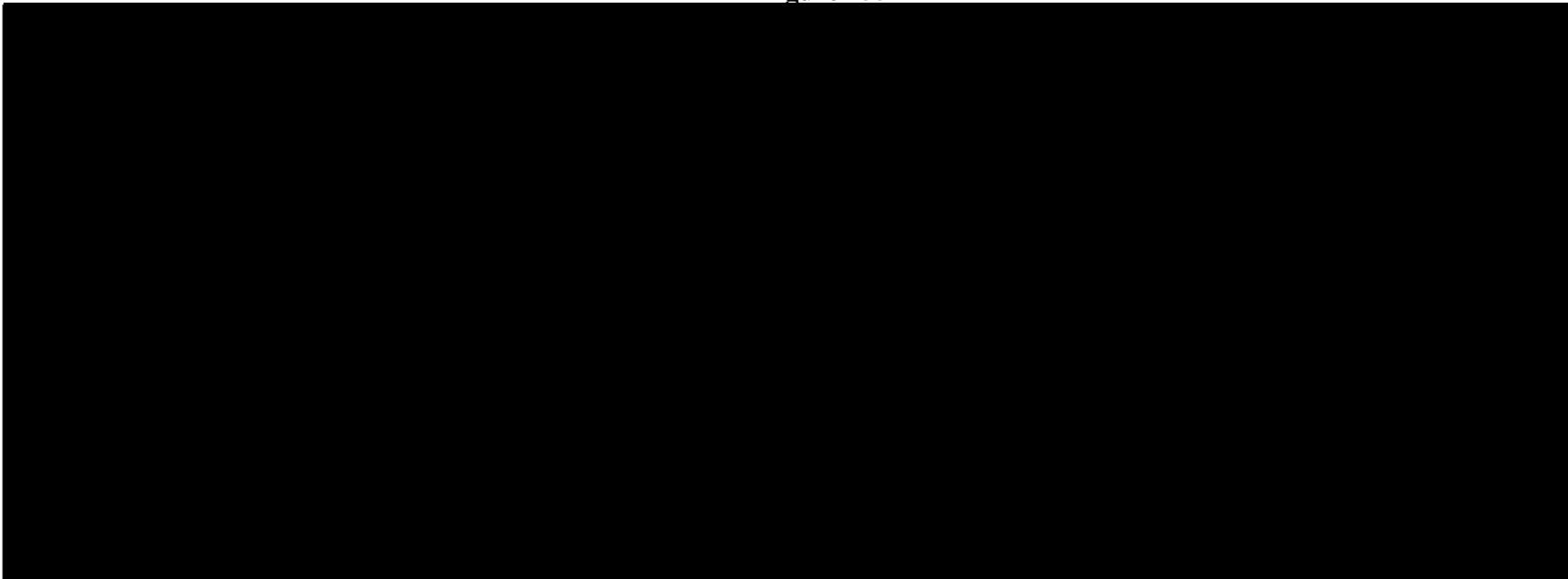


Notes: *See* Gans Report, at fn. 674.

Source: Gans Report, at Figure 19 and associated backup materials.

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**Figure 155**

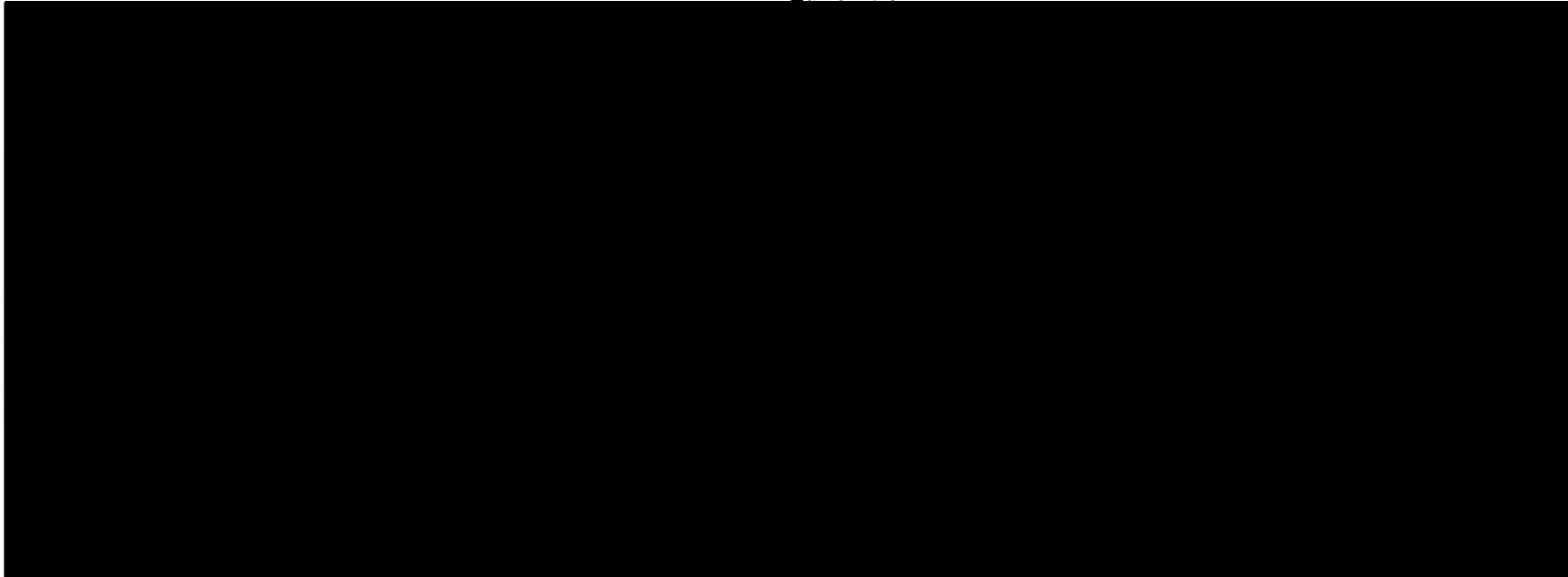


Notes: MDL RFP 243 AdX Data are used for this analysis. The field web\_property\_name is set to "Scripps Networks Interactive, Inc." The field is\_mobile\_app\_request is set to False. The field transaction\_type\_name is set to "OB - Open Bidding." Impressions are measured as matched\_impressions. The first vertical dashed line on the left represents the start of UPR rollout, the second vertical dashed line represents the 100 percent UPR rollout. *See* Gans Report, at fn. 674.

Source: Gans Report, at Figure 20 and associated backup materials.

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**Figure 156**

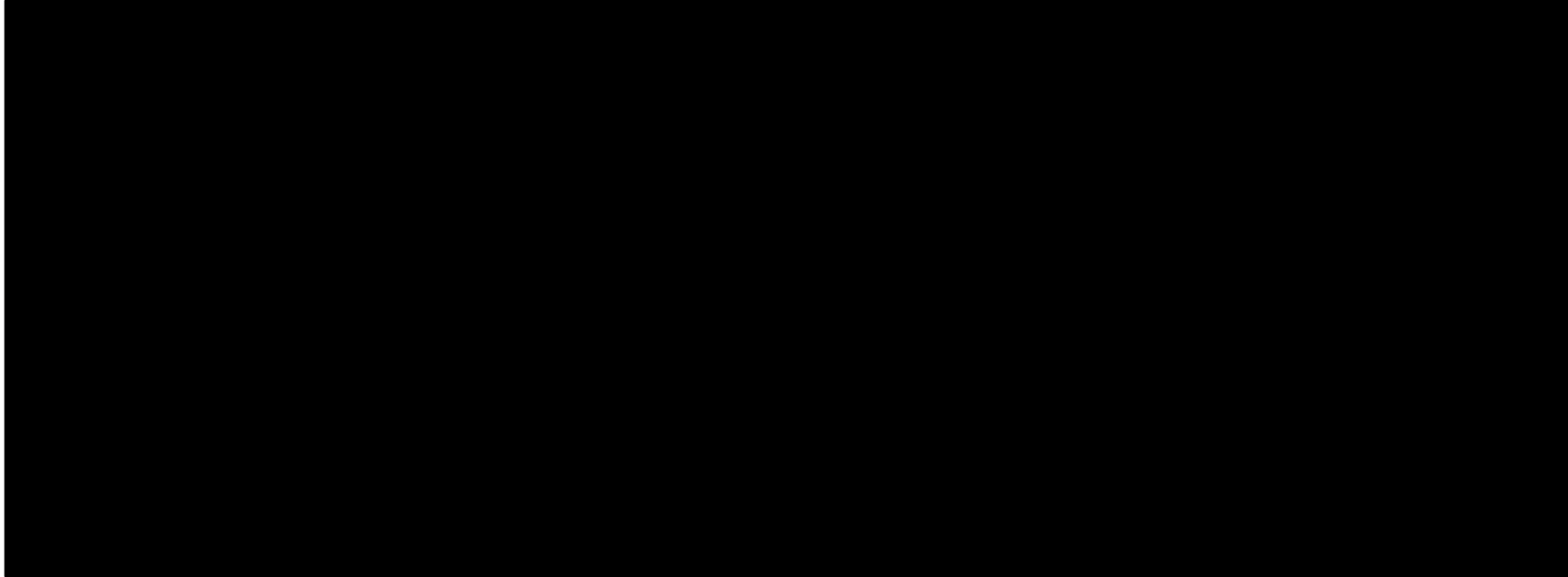


Notes: *See* Gans Report, at fn. 674.

Source: Gans Report, at Figure 20 and associated backup materials.

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**Figure 157**

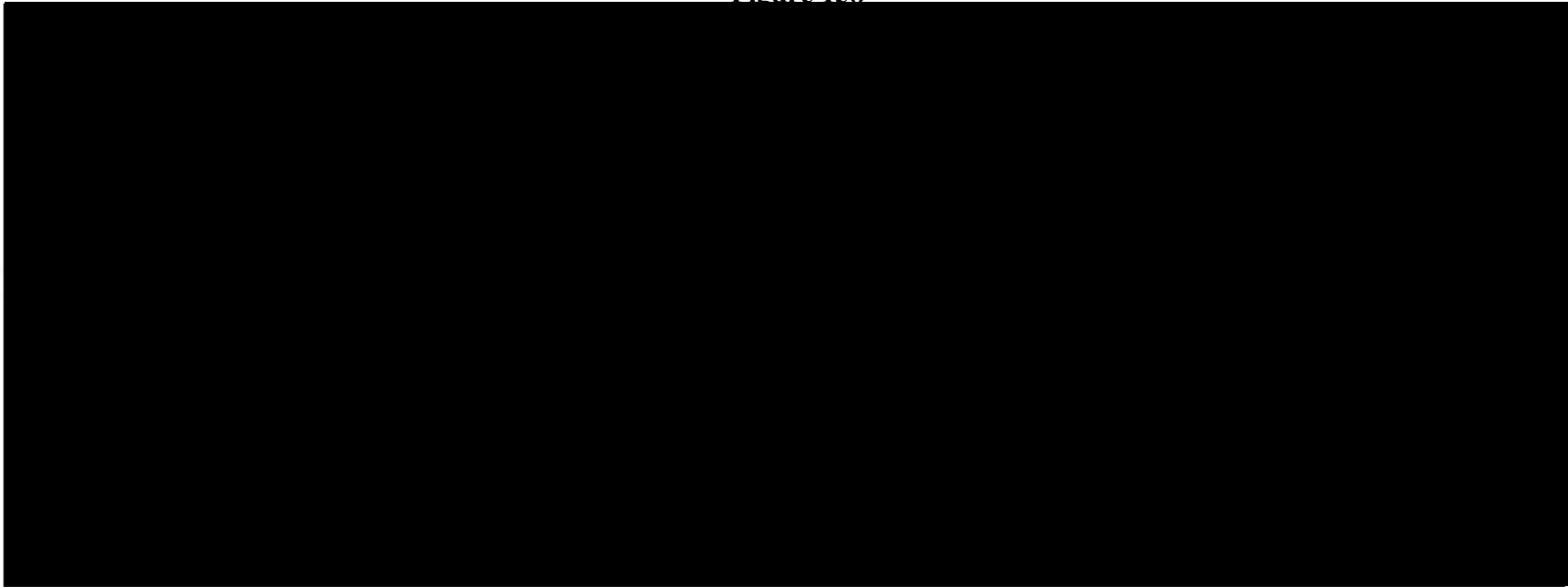


Notes: MDL RFP 243 AdX Data are used for this analysis. The field web\_property\_name is set to "Scripps Networks Interactive, Inc." The field is\_mobile\_app\_request is set to False. The field transaction\_type\_name is set to "OA - Open Auction." Publisher Revenue is measured as pub\_net\_rev\_usd. The first vertical dashed line on the left represents the start of UPR rollout, the second vertical dashed line represents the 100 percent UPR rollout. *See* Gans Report, at fn. 674.

Source: Gans Report, at Figure 19 and associated backup materials.

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**Figure 158**

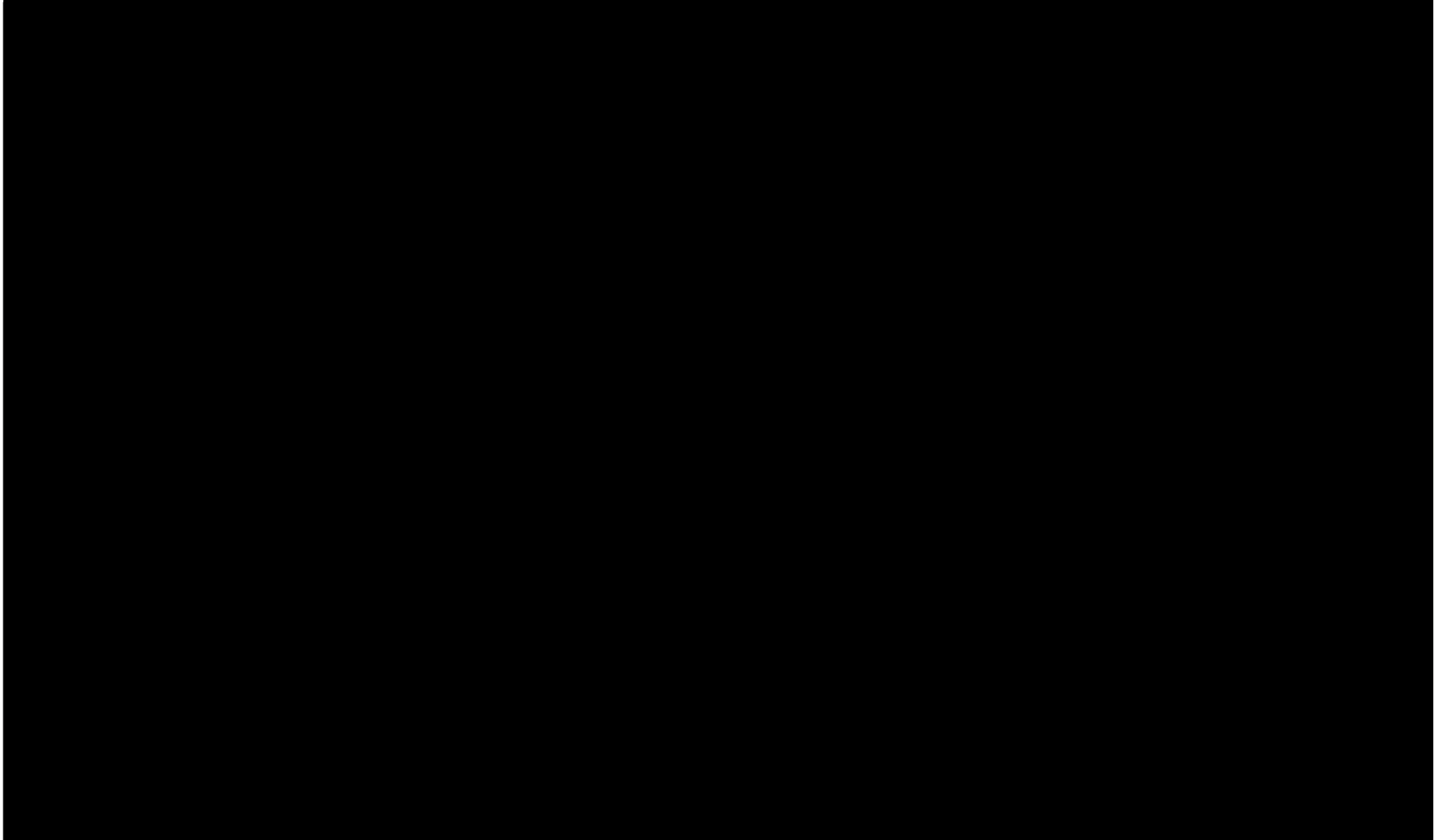


Notes: MDL RFP 243 AdX Data are used for this analysis. The field web\_property\_name is set to "Scripps Networks Interactive, Inc." The field is\_mobile\_app\_request is set to False. The field transaction\_type\_name is set to "OB - Open Bidding." Publisher Revenue is measured as pub\_net\_rev\_usd. The first vertical dashed line on the left represents the start of UPR rollout, the second vertical dashed line represents the 100 percent UPR rollout. *See* Gans Report, at fn. 674.

Source: Gans Report, at Figure 20 and associated backup materials.

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**Figure 159**

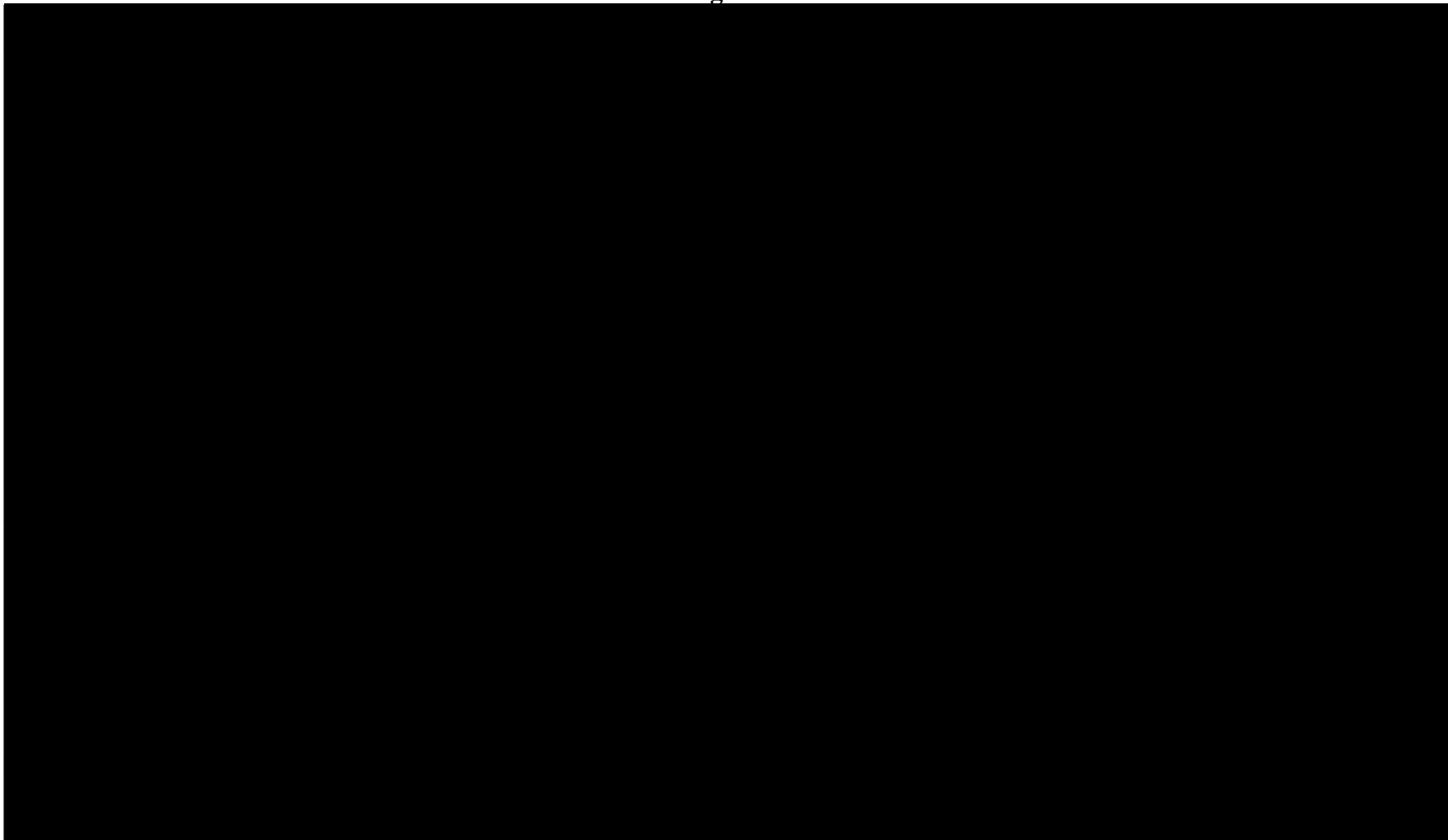


Notes: Header bidding data are not available in DFP Reservations data prior to June 2018. Impressions transacted through Header Bidding do not exclude any reservation type.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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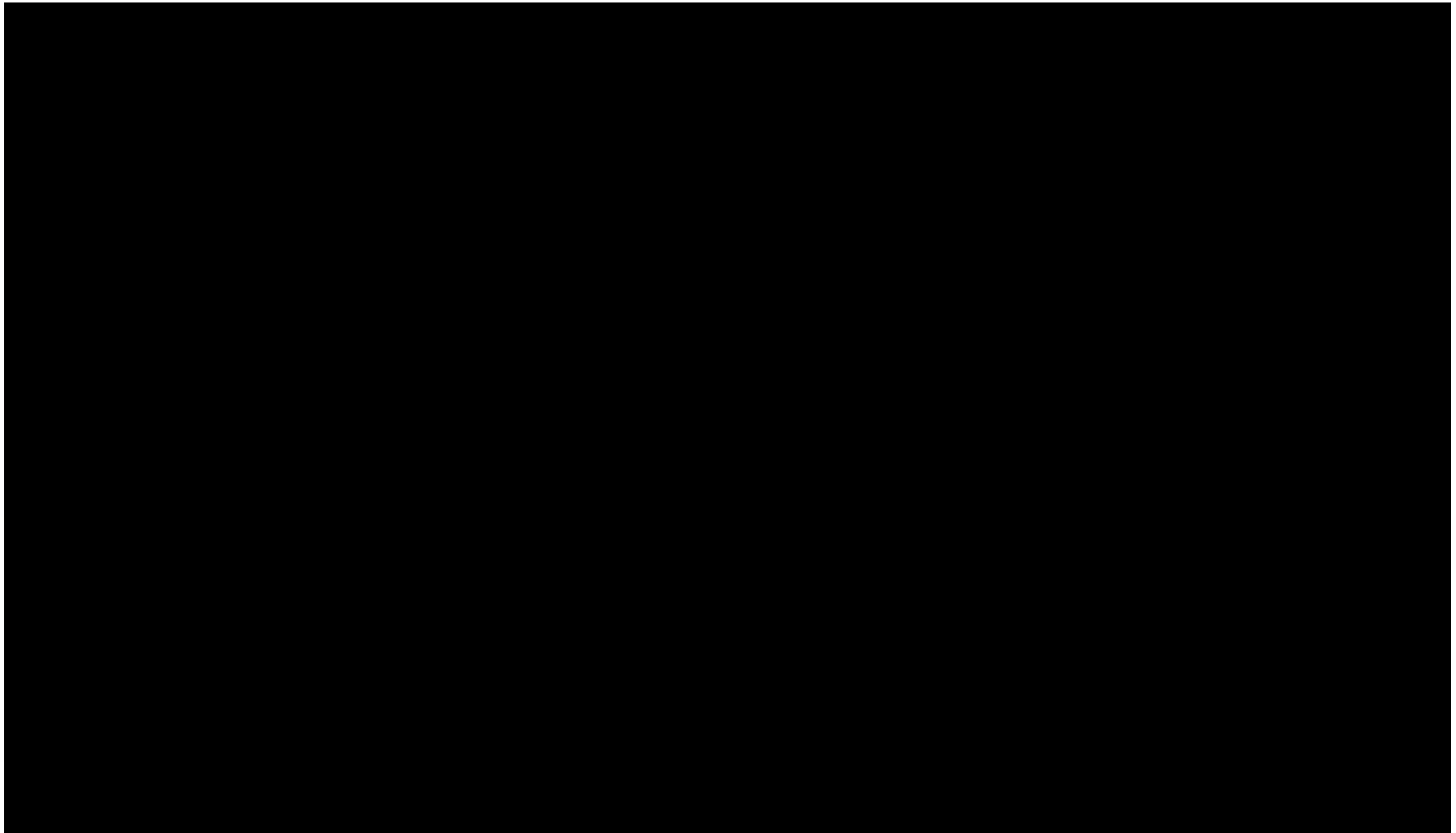
**Figure 160**



Notes: The dotted shading on AdSense impressions indicates limited availability of precise ad format indicators in the AdSense backfill data. Impressions transacted through Header Bidding do not exclude any reservation type. "DFP - Other" encompasses impressions in DFP that are not house ads, direct deals, or header bidding transactions.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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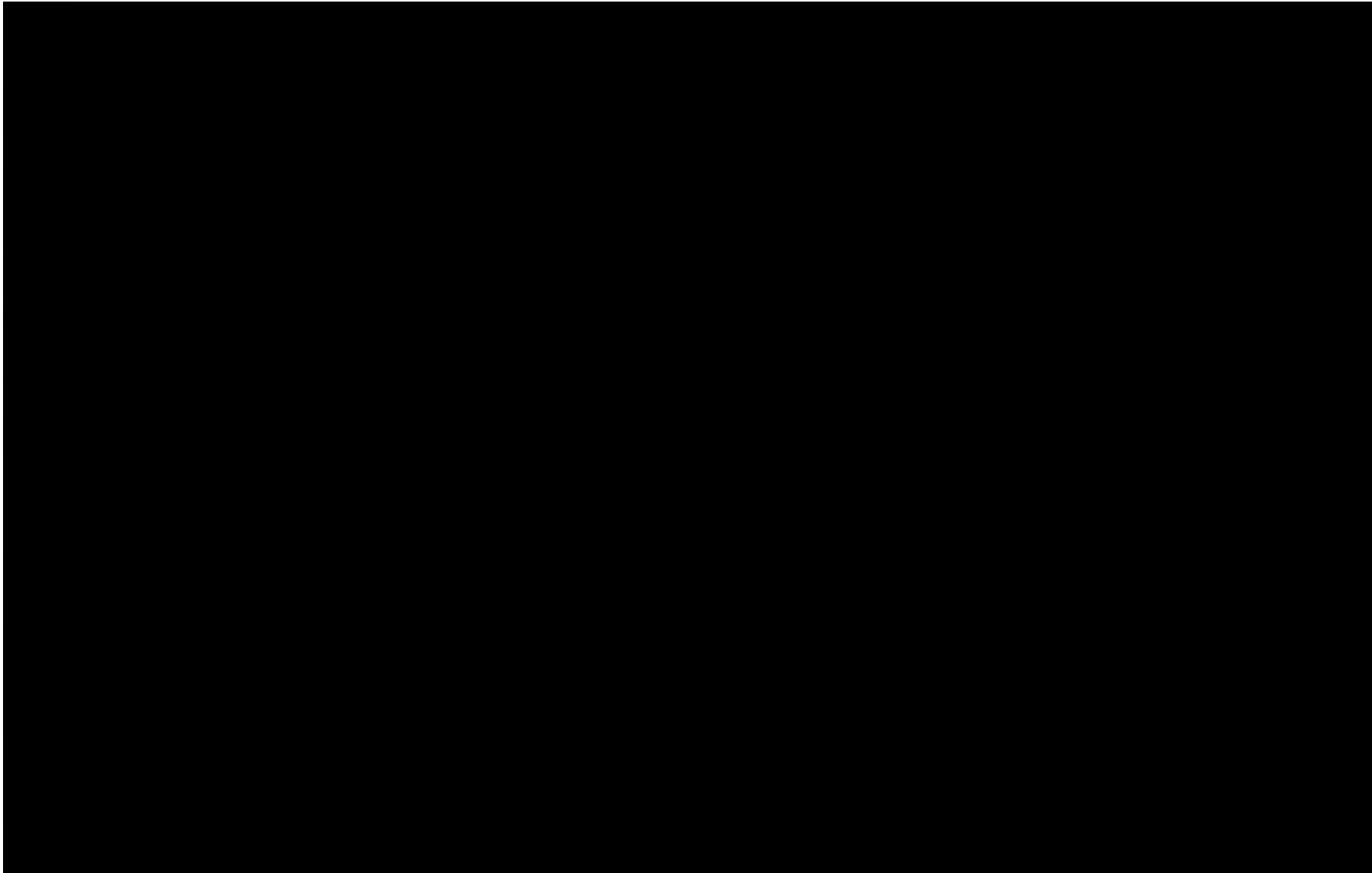


Notes: The dotted shading on DFP and AdSense impressions respectively indicates limited availability of precise mobile app indicators in the DFP Reservations data and of precise ad format indicators in the AdSense backfill data. Impressions transacted through Header Bidding do not exclude any reservation type.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.



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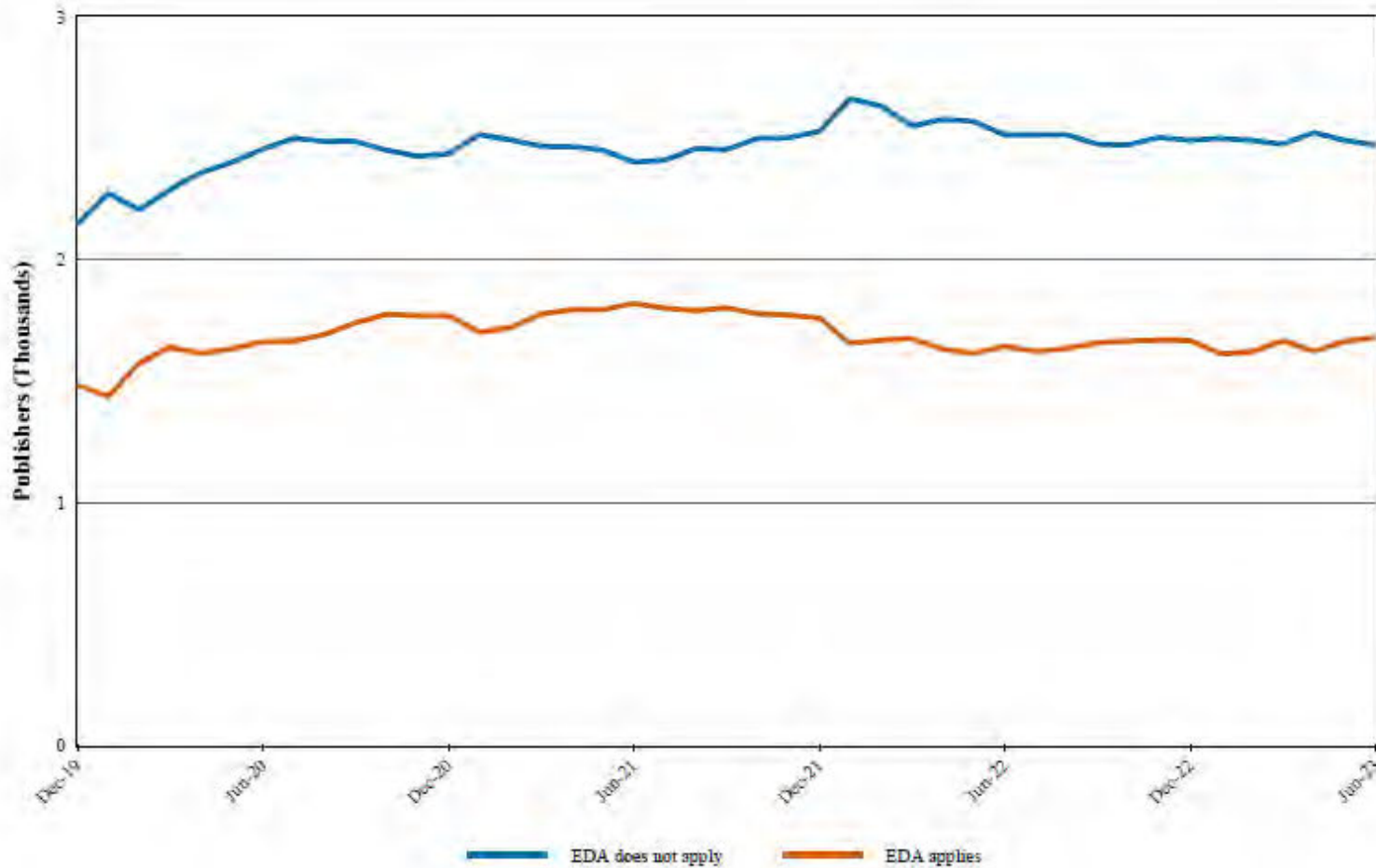


Notes: Publishers are considered affected by EDA if they transact across a combination of Direct Deals and any other transaction venue in the given month. Data are not limited to narrow display ads. AdX and AdSense impressions and publisher revenue not identifiable as belonging to GAM publishers are excluded.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 163**  
**Number of U.S. DFP Publishers Using Header Bidding**  
**By Signal of Potential to Serve Remnant Ads Ahead of Guaranteed Ads**  
**December 2019 - June 2023**



Notes: The potential to serve remnant ads ahead of guaranteed deals refers to instances where, for a particular publisher in a particular month, the data indicate that AdX served impressions where the data indicate that the competing\_reservation\_type\_name was either “sponsorship” or “standard.” Data are limited to publishers that have used header bidding in a given month. Data are not limited to the U.S. and narrow display ads due to data limitations.

Source: DOJ RFP 57 DRX Internal Stats Data.

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**Figure 164**  
**Impressions Volume for U.S. DFP Publishers Using Header Bidding**  
**By Signal of Potential to Serve Remnant Ads Ahead of Guaranteed Deals**  
**December 2019 - June 2023**

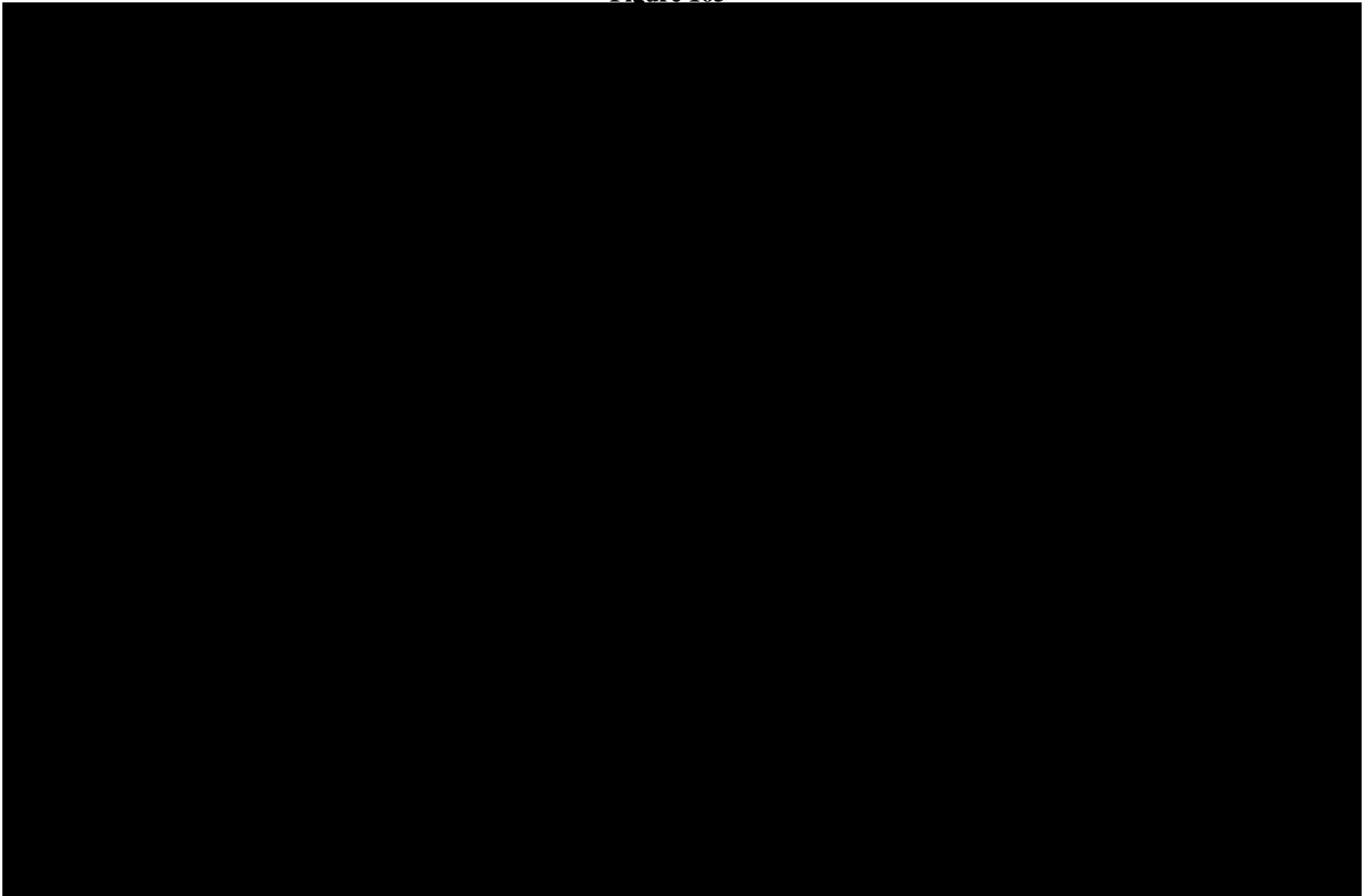


Notes: The potential to serve remnant ads ahead of guaranteed deals refers to instances where, for a particular publisher in a particular month, the data indicate that AdX served impressions where the data indicate that the competing\_reservation\_type\_name was either “sponsorship” or “standard.” Data are limited to publishers that have used header bidding in a given month. Data are limited to the U.S. but not to narrow display ads due to data limitations.

Source: DOJ RFP 57 DRX Internal Stats Data.

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**Figure 165**

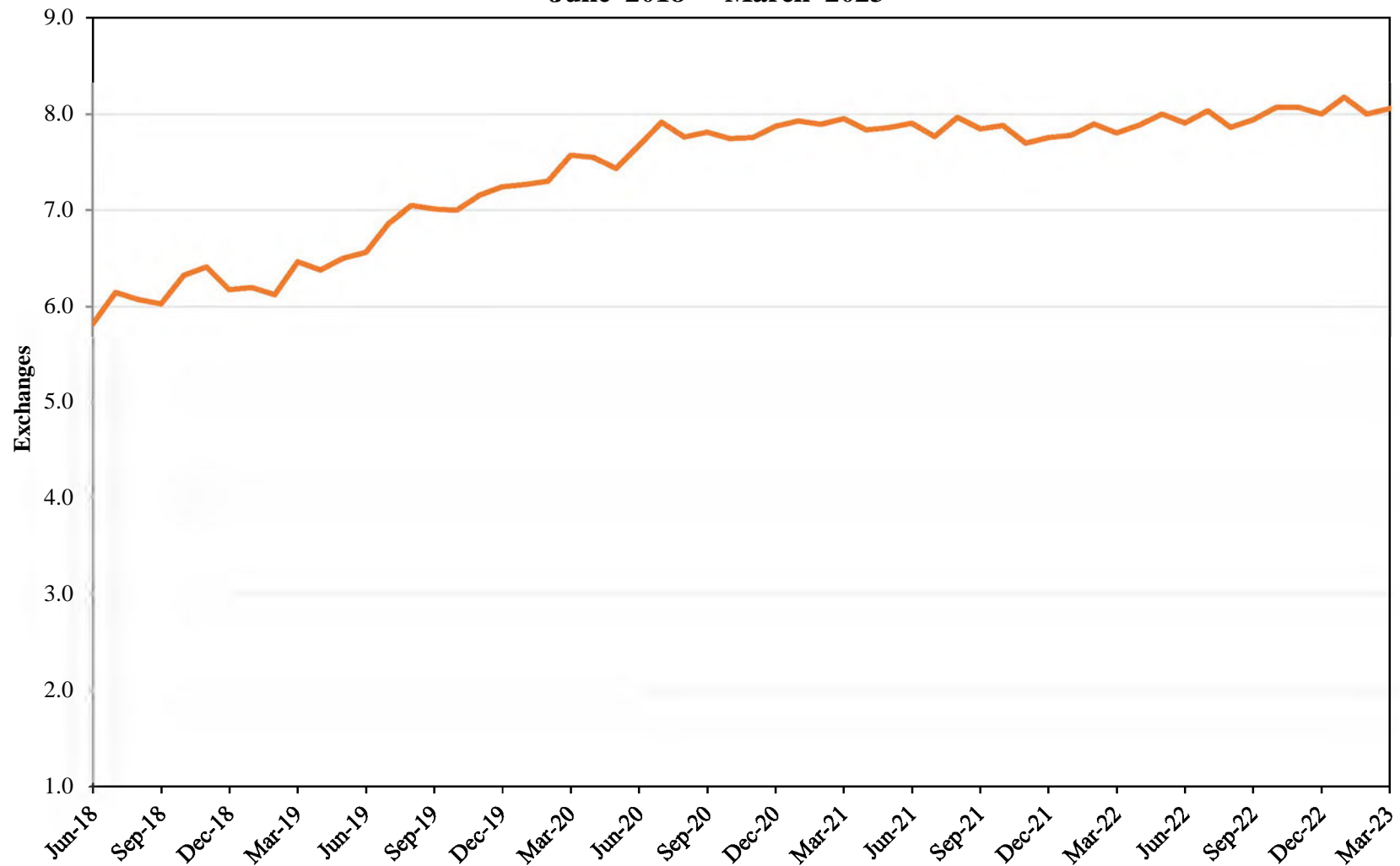


Notes: Header Bidding impressions include only those that were transacted through DFP.

Source: MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 166**  
**Average Number of Header Bidding Exchanges Used by the Top 0.1 Percent of DFP Publishers in Terms of Line Items Used**  
**June 2018 - March 2023**

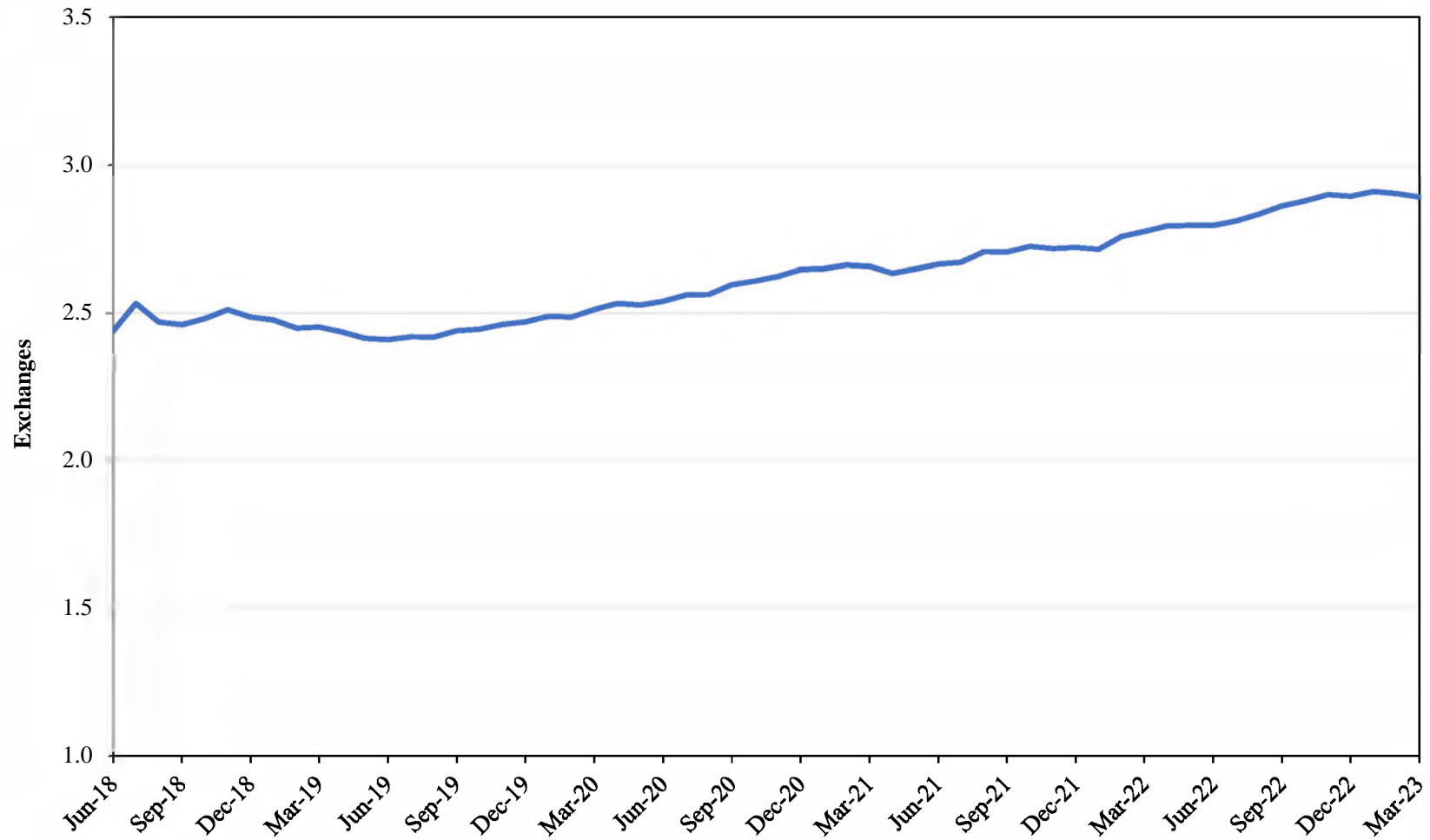


Notes: Only publishers in the top 0.1 percent in terms of total line item usage within DFP are included. Unknown exchanges are grouped together as a single exchange.

Source: MDL RFP 243 DFP Reservations Data; GAM Publisher Active Line Item Data.

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**Figure 167**  
**Average Number of Header Bidding Exchanges Used by Google Publishers**  
**To Transact Display Ads (Narrow)**  
**June 2018 - March 2023**



Notes: Unknown exchanges are grouped together as a single exchange.

Source: MDL RFP 243 DFP Reservations Data.'

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**Figure 168**  
**Sample of Data Fields Provided in Google Ad Manager's NetworkBackfillBids File**

Sample Records						
Field Name	Field Label	Record 1	Record 2	Record 3	Record 4	Record 5
(a)	(b)	(c)	(d)	(e)	(f)	(g)
KeyPart	Unique query identifier	1AB2C_Def	1AB2C_Def	xy1CdeFGH	AsDF3gh4j	1AB2C_Def
TimeUse2	Unix time of a query	1567930000000000	1567930000000000	1567930000000000	1567930000000000	1567930000000000
AdUnitId	DFP Ad unit ID	87654321	87654321	87654321	87654321	87654321
Country	Country	France	France	Brazil	United States	France
CountryId	Country ID	2250	2250	2076	2840	2250
MobileAppId	Mobile app ID					
ProcessingDateAndHour	Processing date and hour	20220128_22	20220128_22	20220128_22	20220128_22	20220128_22
Time	Time of the event	2019-09-08-05:00:00	2019-09-08-05:00:00	2019-09-08-05:00:00	2019-09-08-05:00:00	2019-09-08-05:00:00
DealType	Deal type	.	.	.	.	.
OptimizationType	Optimization type				First Look	
OrderId	Order ID	0	0	2766842910	2766842910	0
BidDealType	Bid deal type			Private auction		
BidSourceType	Bid source type	.	.	.	.	.
BidSellerReservePrice	Bid seller reserve price	\$0.000	\$0.100	\$0.000	\$0.000	\$8.420
BidPrice	Bid price	\$9.3000	\$4.8340	\$1.3500	\$2.1285	\$7.4233
BidRejectionReason	Bid rejection reason	(Winner)	Outbid	Outbid	Outbid	Floor
IsOptimizedDeal	Is Optimized Deal	.	.	.	.	.
AdxAccountId	Ad Exchange account ID	12345678	12345678	12345678	12345678	12345678
LineItemId	DFP Line item ID	0	0	112233445	112233445	0
AuctionType	Auction type	1.00	1.00	1.00	1.00	2.00
BidAdvertiser	Bid advertiser		The JJJ Company	The Mmm Company	Hhh Property	OOO Worldwide Group
BidBidder	Bid bidder	Zzz (EB)	Ccc Exchange (EB)	Ccc Exchange (EB)	Ccc Exchange (EB)	Vvv
BidBuyer	Bid buyer	Zzz (EB)	Ccc Exchange (EB)	Ccc Exchange (EB)	Ccc Exchange (EB)	Vvv
BidDealId	Bid deal ID			123MOP2019F		
BidYieldGroupCompanyId	Bid yield group company ID		22,446,688.00	22,446,688.00	22,446,688.00	
BidYieldGroupNames	Bid yield group names		XXX EBDA - Web	XXX EBDA - Web	XXX EBDA - Web	
DeviceFamily	Device family	Other	Other	Desktop	Mobile	Other
OSFamily	Operating system family	Android	Android	Other	Apple iOS	Android

Source: Google Ad Manager Help, "Ad Manager Data Transfer reports," available at: <https://support.google.com/admanager/answer/1733124>. Accessed July 2, 2024.

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**Figure 169**  
**Number of U.S. DFP Publishers by AdX Usage and Data Transfer Payment**  
**January 2014 - June 2023**

	<b>Premium Publishers</b>	<b>All Publishers</b>
	<b>(a)</b>	<b>(b)</b>
<b>AdX Publishers Paying DT Fees</b>	243	244
<b>Publishers Paying DT Fees</b>	261	265
<b>Publishers Using AdX</b>	1,255	3,784
<b>Number of Publishers</b>		16,072

Notes: Publishers that pay fees to obtain data transfer files receive redacted auction reports along with other files. Not all publishers who pay fees to receive data transfer files subscribe to receiving Bidding Data Transfer (BDT) files.

Source: DOJ RFP 57 DFP Fees Data; MDL RFP 243 AdX Data.



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**Figure 170**  
**Number of U.S. DFP Publishers Paying for Data Transfer Files**  
**January 2014 - June 2023**

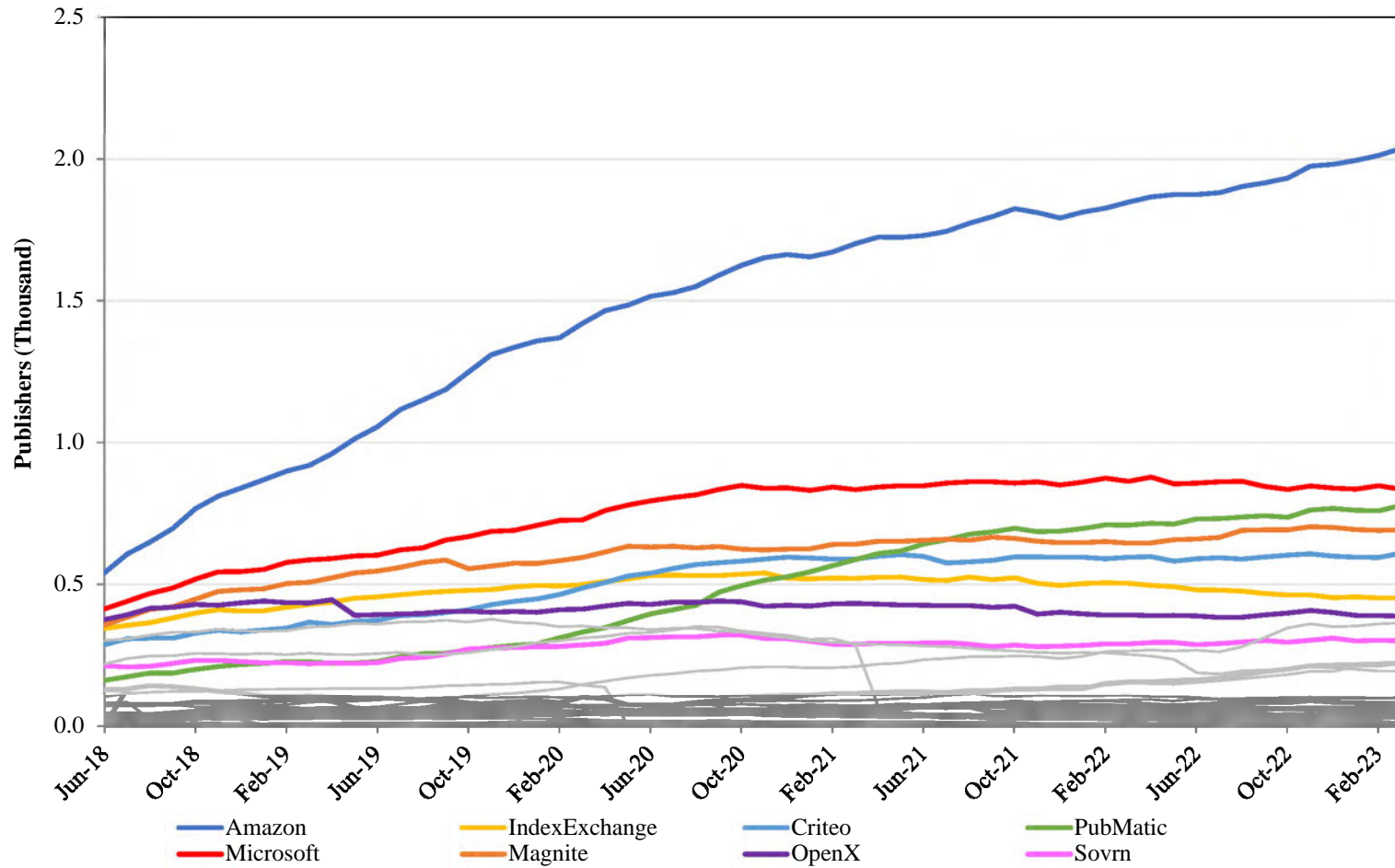


Notes: Publishers that pay fees to obtain data transfer files receive redacted auction reports along with other files. Not all publishers who pay fees to receive data transfer files subscribe to receiving Bidding Data Transfer (BDT) files.

Source: DOJ RFP 57 DFP Fees Data.

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**Figure 171**  
**Count of DFP Publishers Using Each Third-Party Exchange via Header Bidding**  
**To Transact Display Ads (Narrow)**  
**June 2018 - March 2023**

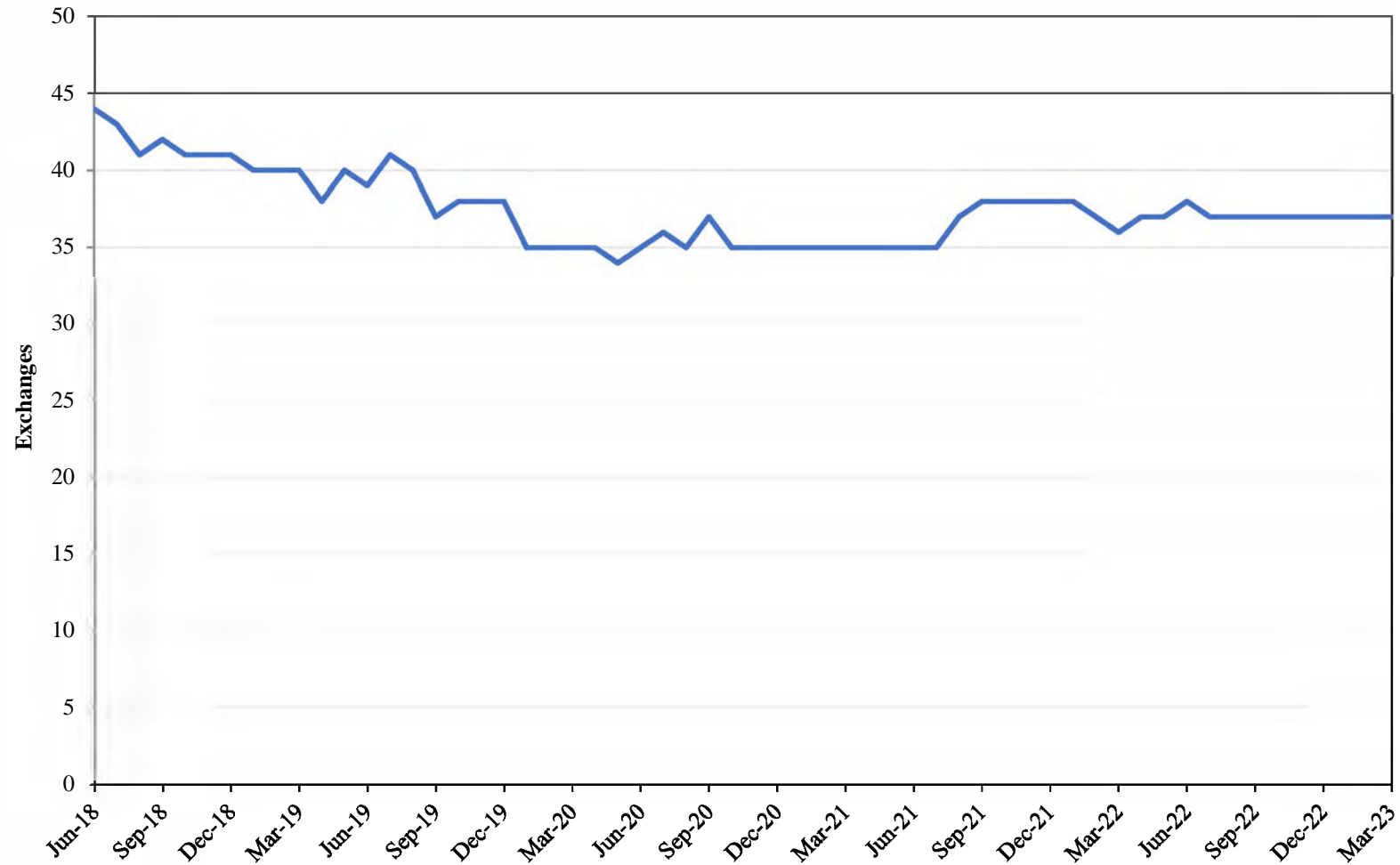


Notes: Unknown exchanges are excluded from the chart above

Source: MDL RFP 243 DFP Reservations Data.

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**Figure 172**  
**Count of Header Bidding Exchanges Used by DFP Publishers**  
**To Transact Display Ads (Narrow)**  
**June 2018 - March 2023**

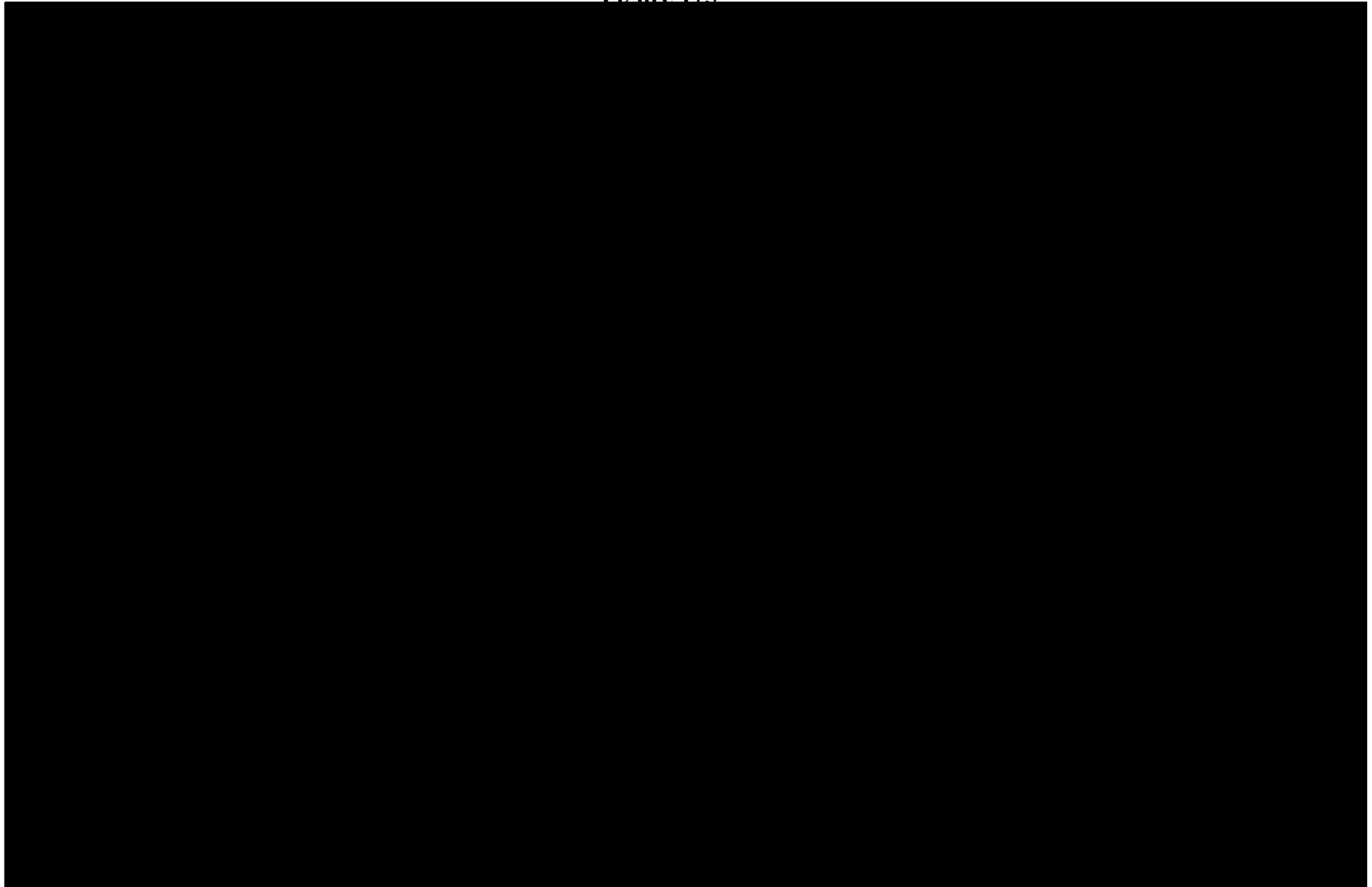


Notes: Limited to exchanges that transact impressions viewed by users in the United States. Unknown exchanges are grouped together as a single exchange.

Source: MDL RFP 243 DFP Reservations Data.

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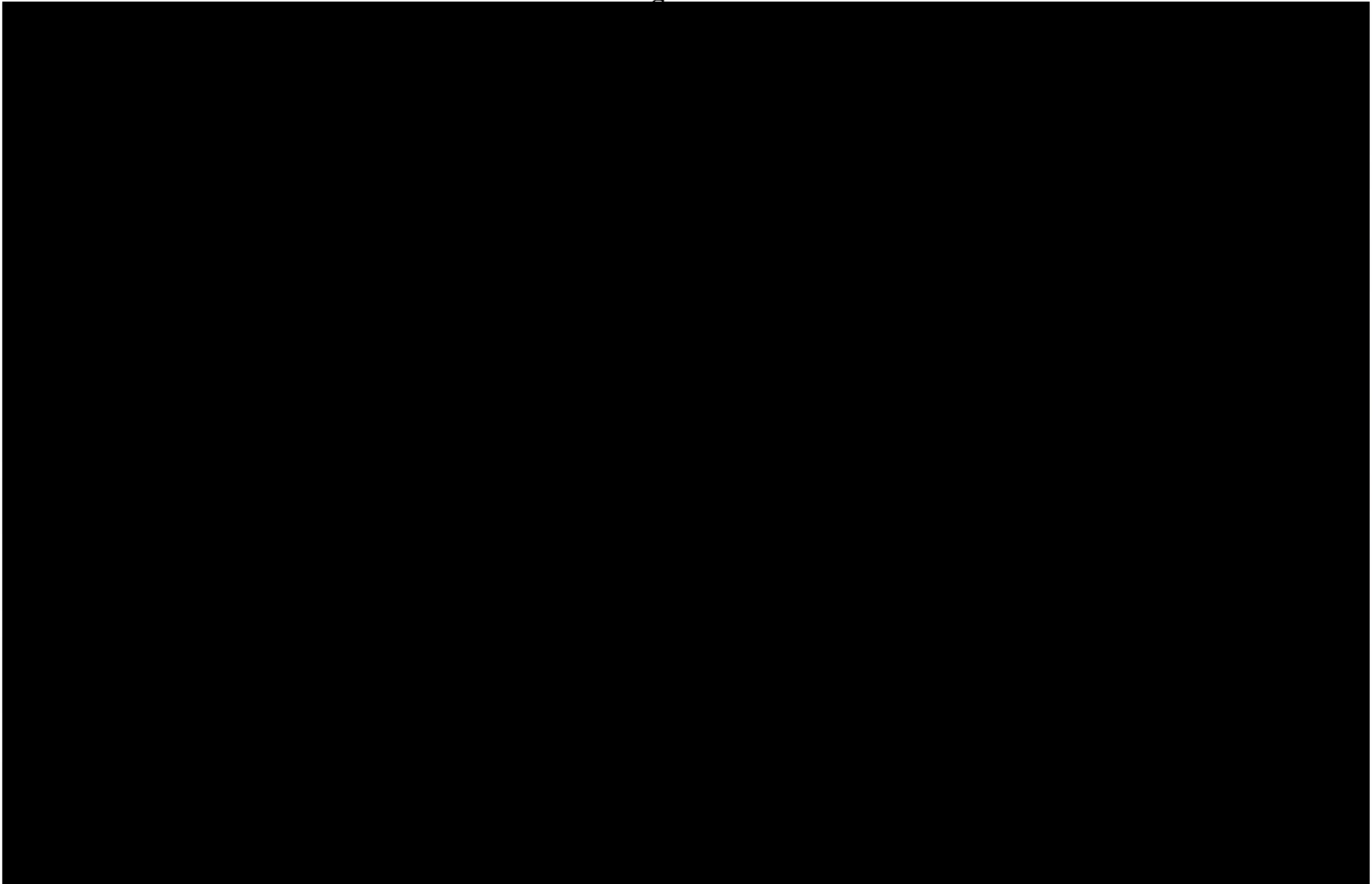
**Figure 173**



Source: MDL RFP 243 AdX Data.

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**Figure 174**

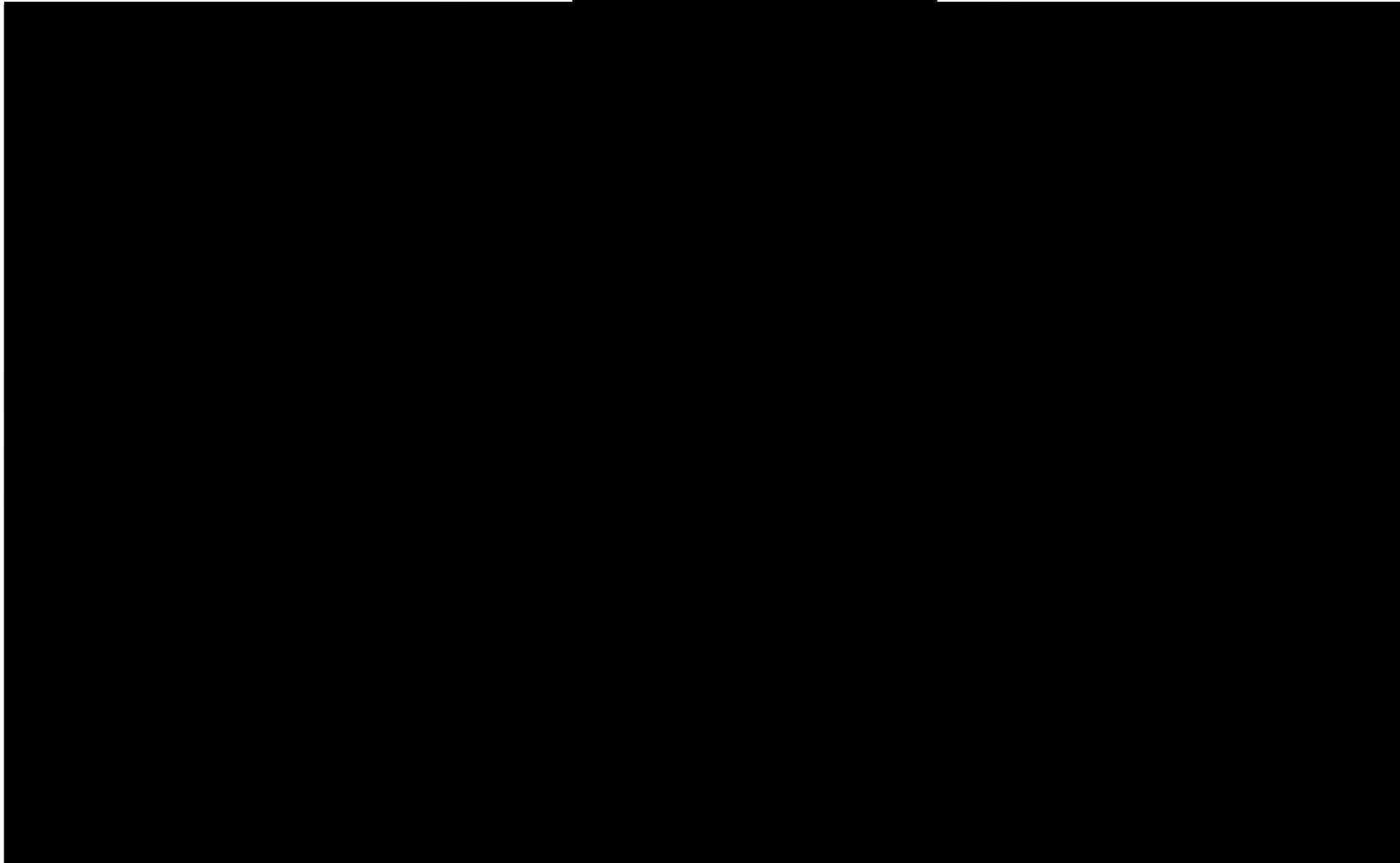


Notes: "Other" represents all non-Google Ads ad buying sources.

Source: MDL RFP 243 AdX Data.

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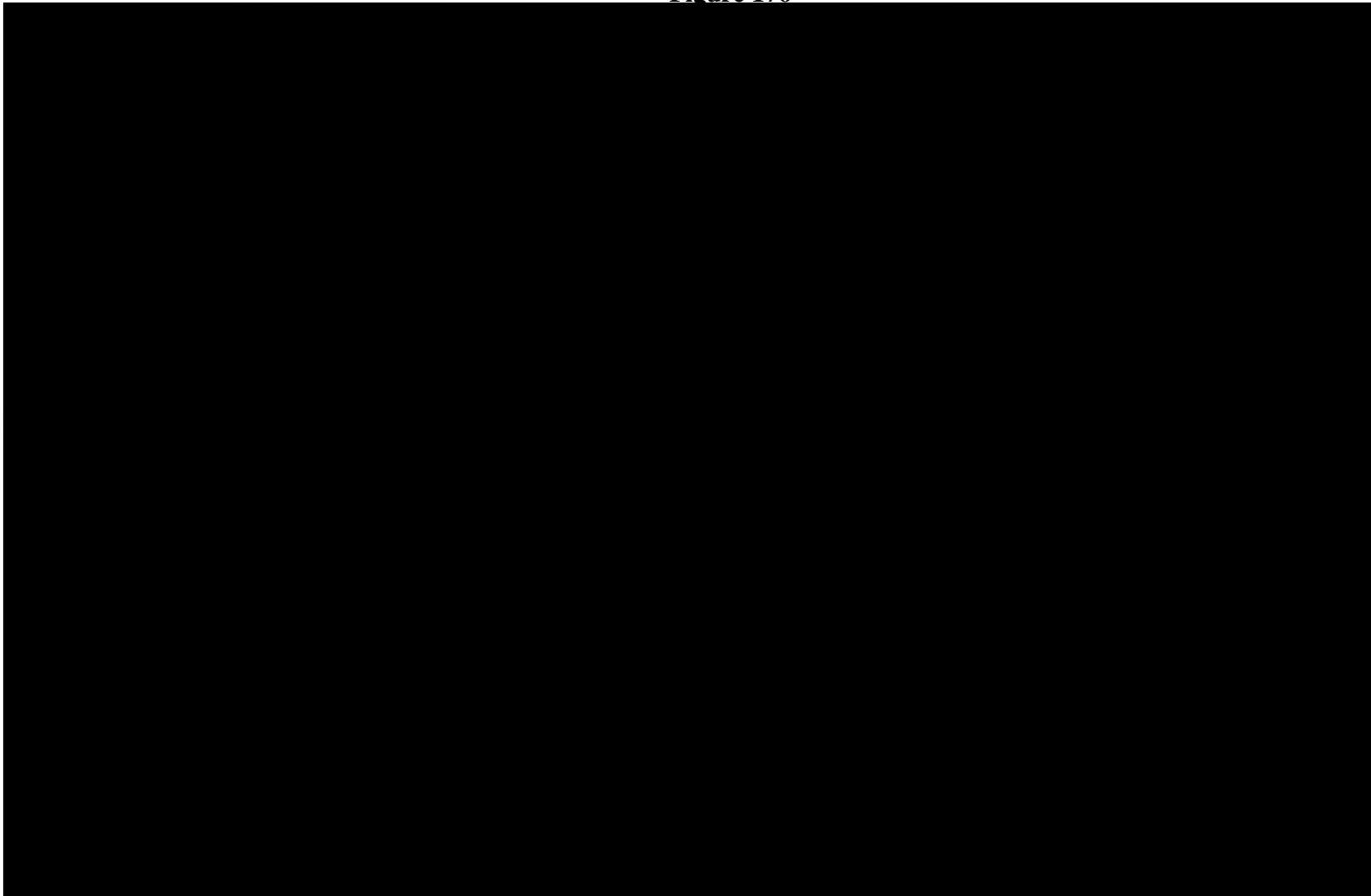
**Figure 175**



Source: Gans Report, Figure 33A.

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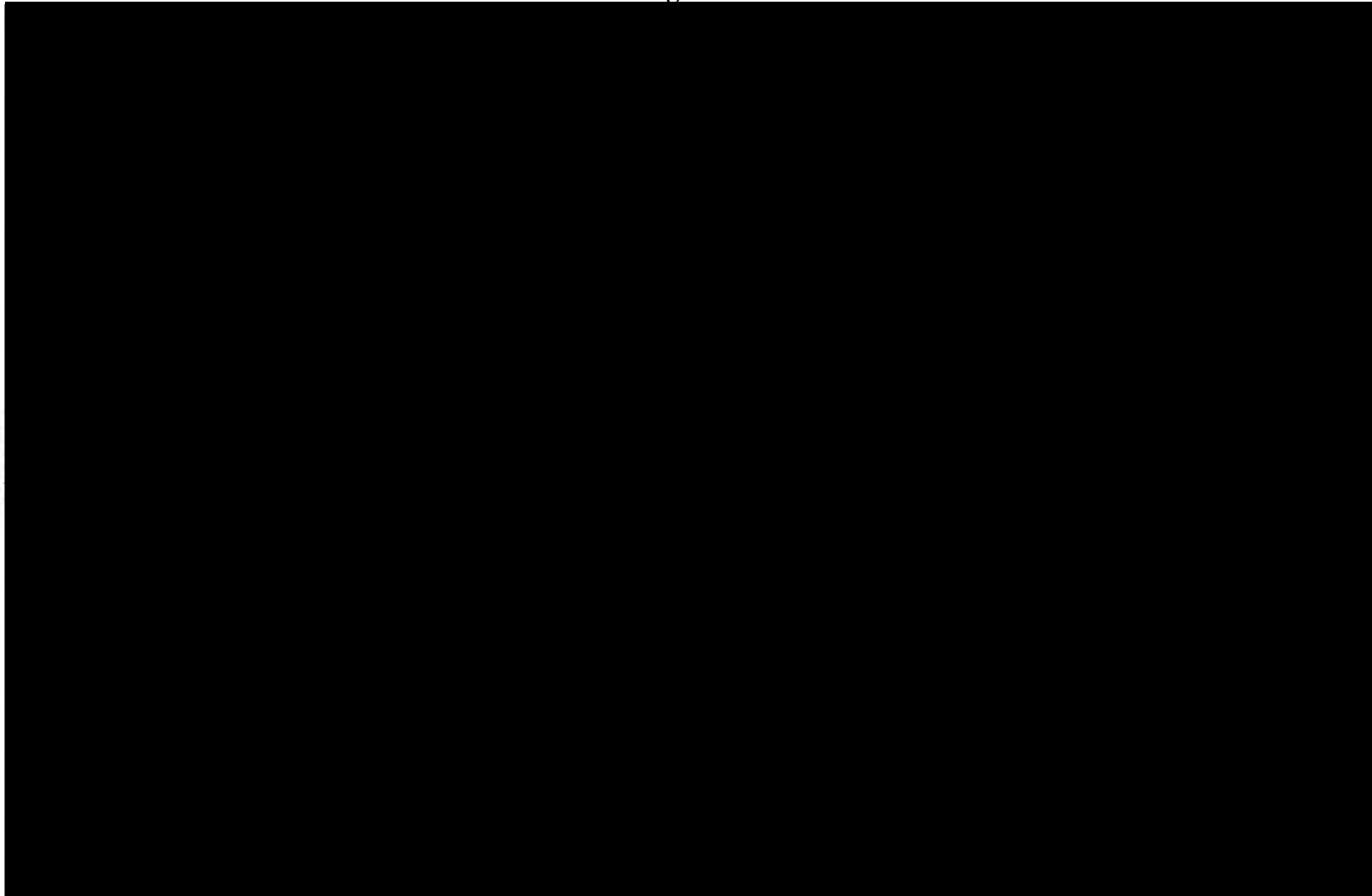
**Figure 176**



Source: Gans Report, at Figure 33A.

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**Figure 177**

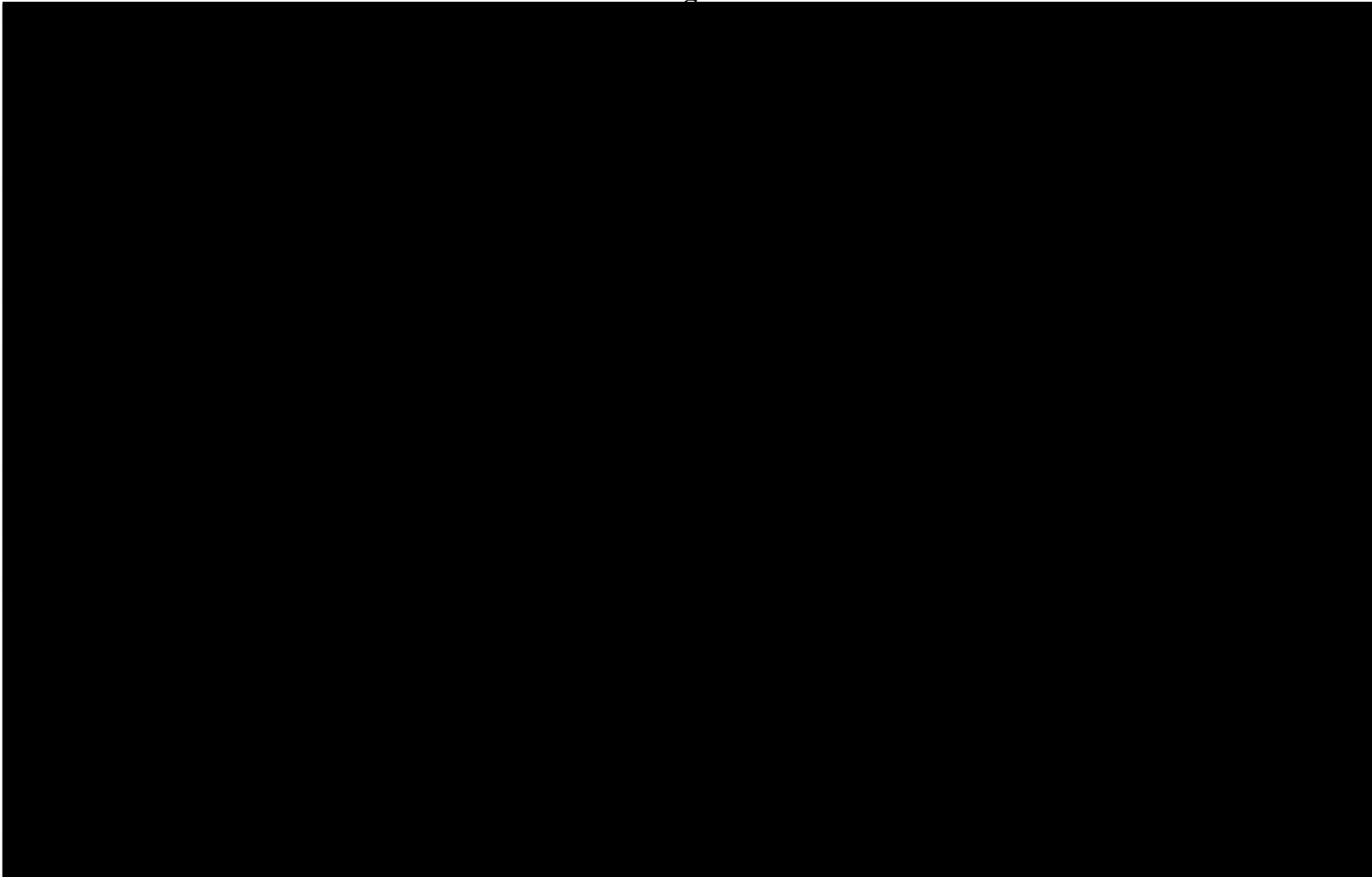


Source: Gans Report, at Figure 33B.



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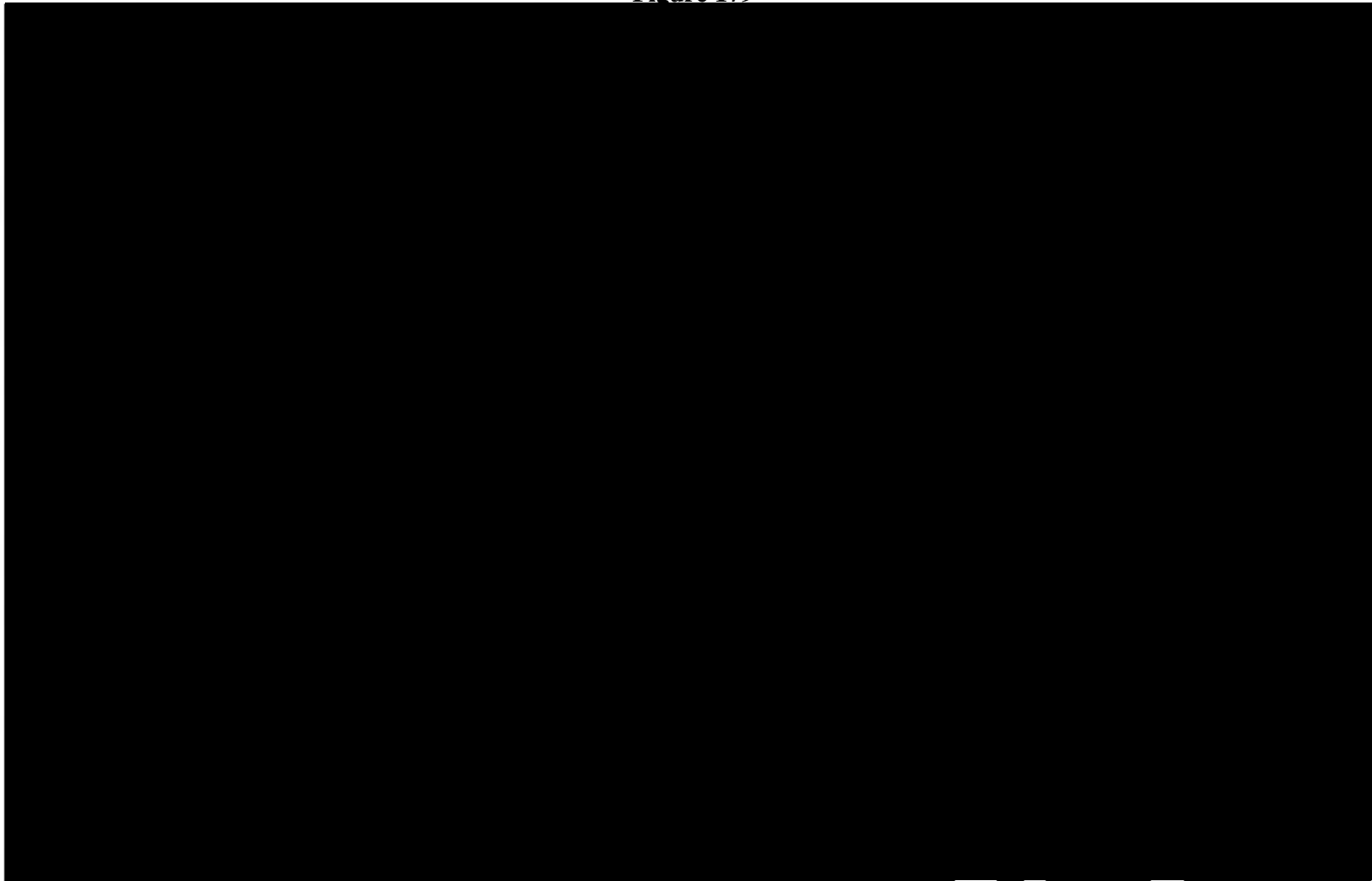
**Figure 178**



Source: Gans Report, at Figure 36.

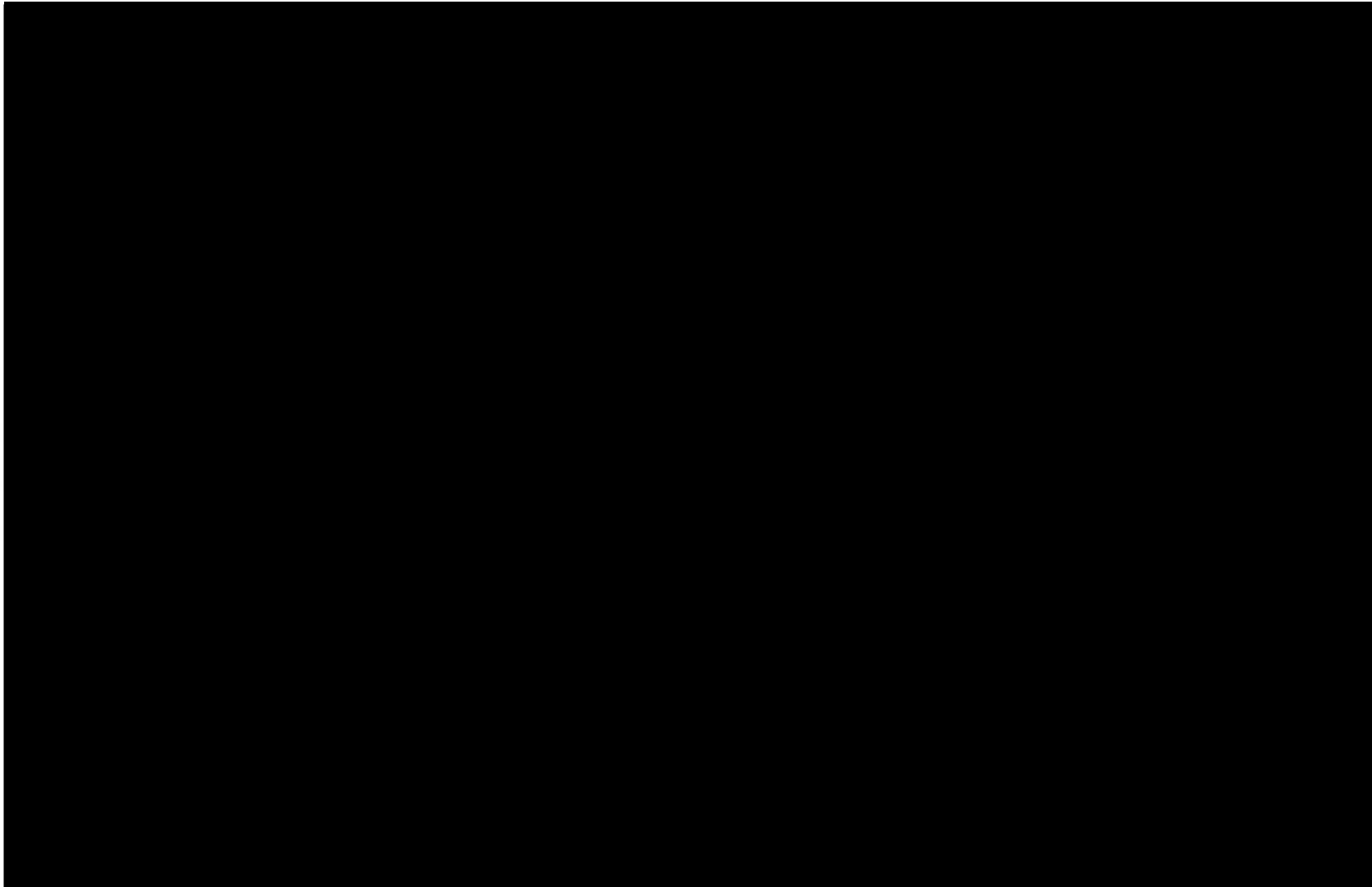
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**Figure 179**



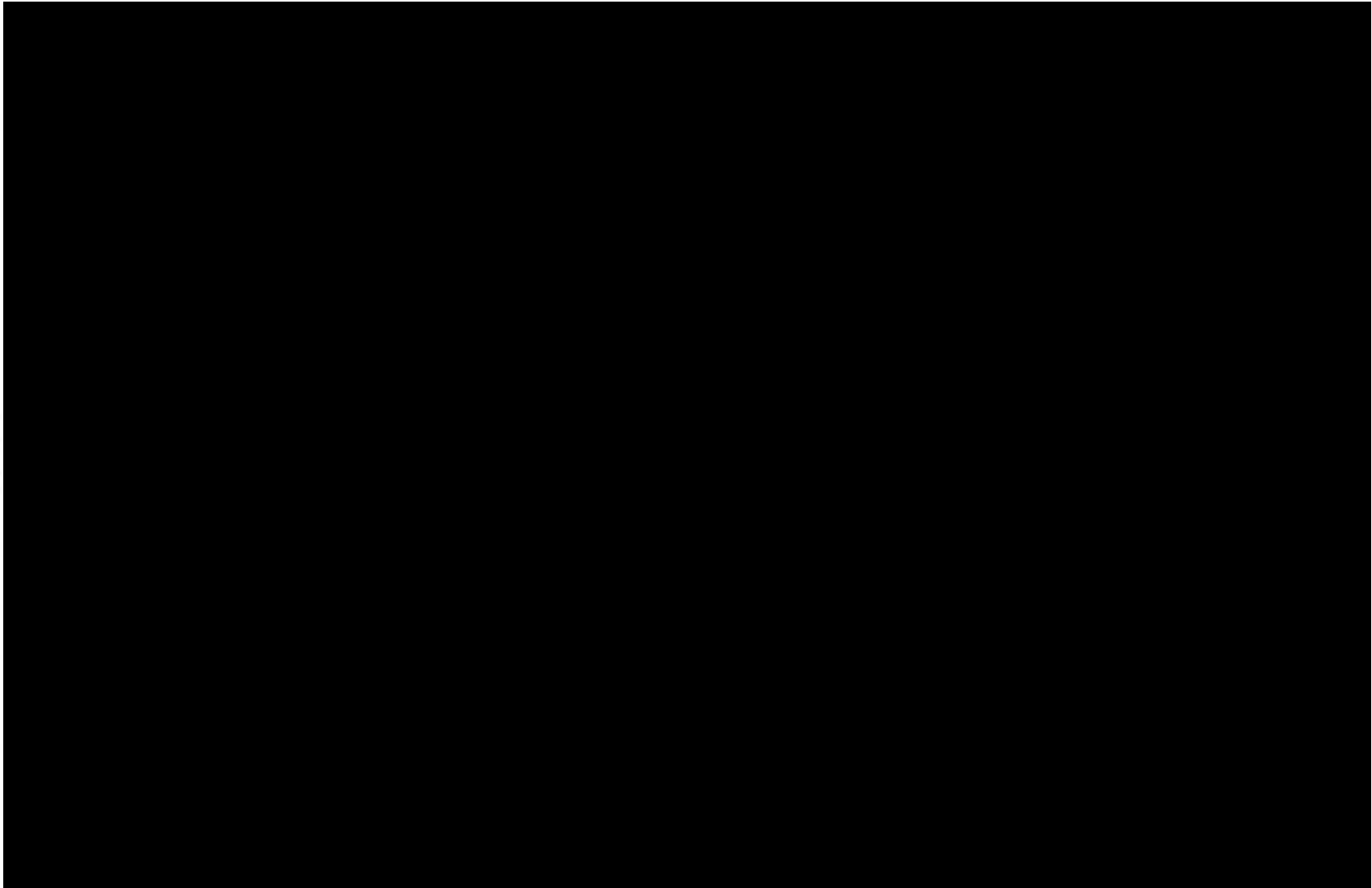
Source: Gans Report, at Figure 36.

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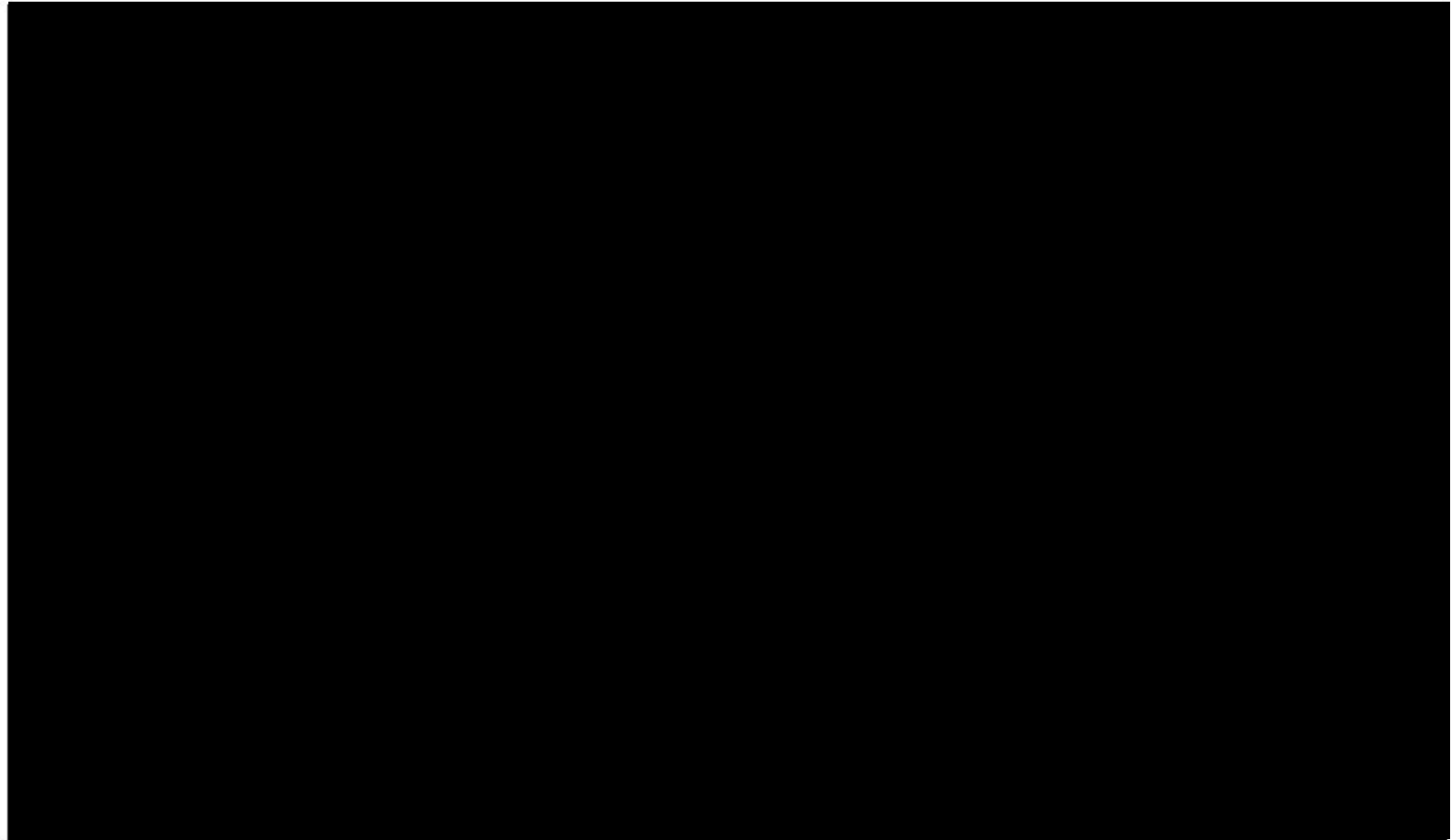
Source: Gans Report, at Figure 38.

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Source: Gans Report, at Figure 38.

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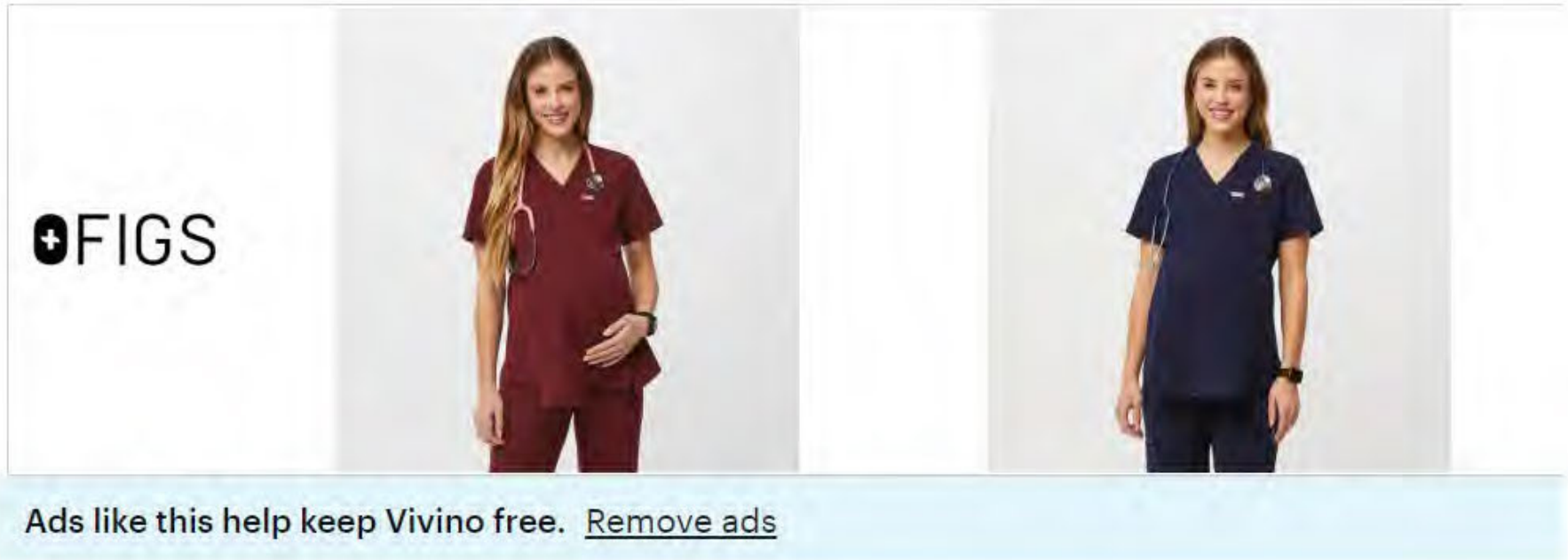


Notes: Limited to impressions viewed by U.S. users. AdX and AdSense impressions not identifiable as belonging to GAM publishers are excluded.

Source: MDL RFP 243 AdSense Backfill Data; MDL RFP 243 AdX Data; MDL RFP 243 DFP Reservations Data.

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**Figure 183**  
**Example of Display Ads on Vivino.com, a Wine Marketplace and Social Sharing Website**



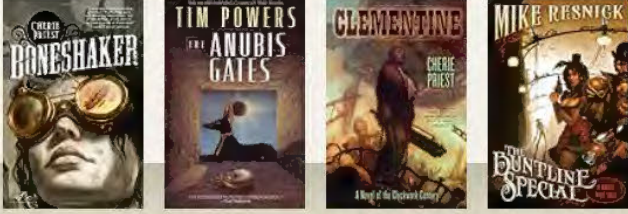
Source: Vivino, "Home," available at: <https://www.vivino.com/US-TX/en/>. Accessed June 30, 2024.

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**Figure 184**  
**Example of Display Ads on Goodreads.com, a Book Review and Social Sharing Website**

What will you discover?

Because Deborah liked...




She discovered:




Steam Punk, Science Fiction, Fantasy

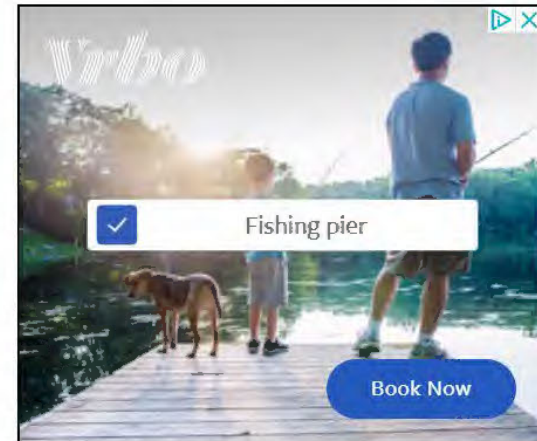
Because Brian liked...



He discovered:



Decision-making, Sociology, Marketing



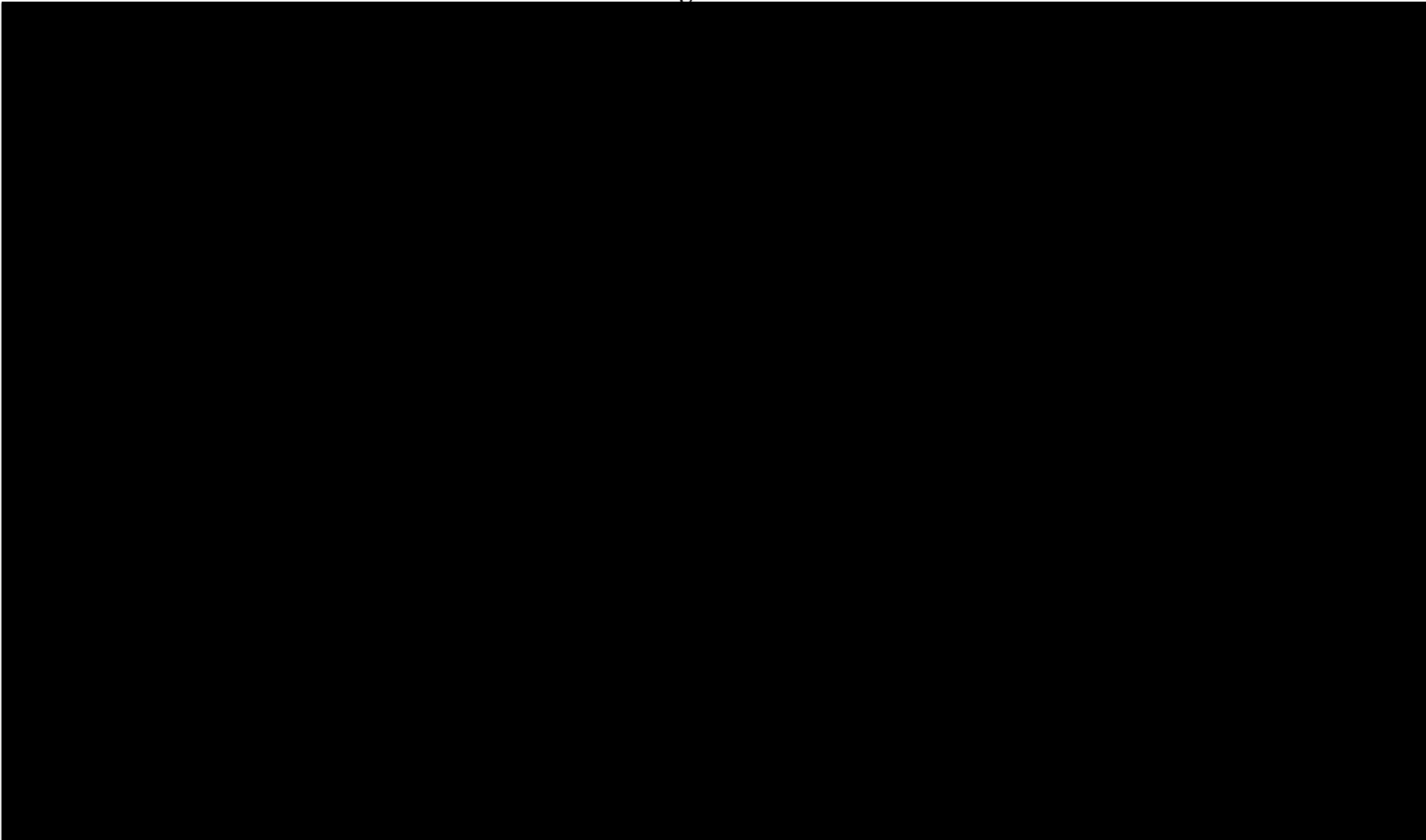
News & Interviews

**Readers' Top 100 Romances of the Past Three Years**

Source: Goodreads, "Home," available at: <https://www.goodreads.com/>. Accessed June 30, 2024.

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**Figure 185**



Source: MDL RFP 243 AdX Data.